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SARE 
1998

North Central Region SARE ANNUAL REPORT





A Sicangu Lakota Native American girl sits in front of her gardening project on the Rosebud Sioux Reservation in South Dakota. Gardening on the Reservation builds confidence and endeavors to improve health of the Sioux Native Americans.
Special Diversity Enhancement Grant



In Portsmouth, Iowa, David Reinig is testing the feasibility of using corn stalk ash, produced from industrial processes, to fertilize his corn and soybean crops. In initial tests, Reinig reports a 13 percent increase in yields in his soybean fields.
FNC 97-173



At Hen House Markets in Kansas City, rancher Diana Endicott conducts taste tests and meets consumers of her "natural beef" branded product, raised by a cooperative of beef producers in Kansas and Missouri. Endicott, of Bronson, Kan., used SARE funds for market research and product development.
FNC 97-171

North Central Region SARE

USDA Sustainable Agriculture Research & Education

1998 Annual Report

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Outside Cover Photos

Background: Minnesota stream ecology is improved by careful grazing on Ralph Lentz's farm in Lake City. Lentz points to a spot where his management-intensive grazing paid off by improving vegetation and water quality. *FNC 97-177*

Front Cover, top: Paul Klamm, in Watford City, N.D., is comparing a traditional spring wheat/fallow/spring wheat rotation with grazing yearling cattle on summer annuals. His SARE project helped him realize that grazing could double his profit per acre in the first year of the project. *FNC 97-176*

Front Cover, bottom: Holding up a tree shelter, Mary Carter coordinates an agroforestry project to use CRP acres for a productive nut and fruit tree enterprise. She calls her Fairfield, Iowa, SARE project "Trees for Food." *FNC 97-184*

Back Cover, top: Sheep cast gazes from their home in Erhard, Minn., where Michael and Vickie Burke are using a SARE grant to compare growth and carcass quality between South African Dorper sheep and Polypays lambs. They found that the Dorper sheep produced superior carcasses. *FNC 97-182*

Back Cover, middle: In Zurich, Kan., project coordinator Richard Baldwin examined the potential of Waygu cattle as a biological control of small soapweed. The Waygus' potential is shown here in a partially grazed and yellowing soapweed. *FNC 97-180*

Back Cover, bottom: As dairy producers look for ways to improve profits, George Shetler found a solution in processing his milk on-farm, with low-cost equipment and delivery trucks. The Shetlers, in Kalkaska, Mich., will also have a storefront to market dairy products on the farm. *FNC 97-199*

This material is based on work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under a variety of Cooperative Agreement Nos. Any opinions, findings, conclusions or recommendations expressed in this publication are those of author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture. • It is the policy of the SARE Program and the University of Nebraska not to discriminate on the basis of gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation. • Mention of trade names, corporations, organizations or other entities in this report is not an endorsement of them by the SARE program. • This report is printed on recycled paper.

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SARE in the North Central Region

We strive to create and manage a system designed to encourage the involvement of farm and nonfarm citizens in the process of discovery and learning that leads to achieving a more sustainable, environmentally benign agriculture.

-NCR SARE Mission Statement

What is SARE?

USDA federal competitive grants program, first authorized by the 1985 farm bill; first funded in 1988.

Congress allocated nearly \$11.5 million in 1998 for four U.S. regions: the Northeast, South, West and **North Central**.

Directed by regional administrative councils comprised of a variety of agricultural stakeholders.

Provides funds for projects led by researchers, educators, producers, nonprofit organizations and others exploring environmentally sound, economically viable, socially responsible agriculture.

To achieve its mission, the USDA's North Central Region (NCR) Sustainable Agriculture Research and Education (SARE) program has awarded more than \$10 million worth of competitive grants to farmers and ranchers, researchers, educators, public and private institutions, nonprofit groups and others exploring sustainable agriculture in 12 states. A decade of research and education has not only created a new body of knowledge, but has also supported and connected thousands of individuals and organizations working to enhance NCR agriculture for future generations.

The 12 NCR states — Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin — have a rich agricultural history. The region embodies what most people think of when they envision the Heartland ... endless rows of corn, strong family traditions, quaint rural towns. But it also includes many alternative agricultural enterprises, such as direct marketing enterprises and organic farms. The NCR's challenge has been to hold fast to historical roots in a contemporary manner, preserving its place in the front lines of food production and promoting healthy food systems.

From the wheat and cattle of the high plains to the dairy and orchards of the northeast; from the corn, soybeans and tall grass in our mid section to horticulture in the Ohio river valley; from community-supported agriculture to farm cooperatives region-wide, the NCR's agricultural landscape is large and diverse.

The region's cultural history and agricultural prowess behooves us to enhance rural areas and support healthy, productive farms and ranches. SARE strives to sustain NCR agriculture by encouraging research and education on profitable and environmentally sound systems that strengthen communities.

NCR Goals are to: foster site-specific, integrated farming systems; satisfy human food and fiber needs; enhance environmental quality, natural resource conservation and the integration of on-farm and biological resources; enhance the quality of rural life and support owner-operated farms; protect human health and safety; and promote crop, livestock and enterprise diversity and the well-being of animals.

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* AC members rotate in June; therefore, some slots have two names to represent the turnover.

Foreword

In January 1998, the USDA National Commission on Small Farms reported on the condition of farming and its place in our food system. The resulting document, *A Time to Act*, recommended that the USDA institute a national strategy to boost and sustain small farms. Authors of the report encouraged increased funding for the SARE program as a vehicle to support and promote sustainable agriculture.

In the wake of the Commission's report, North Central Region (NCR) SARE embarked on a productive year, as outlined in this annual report. Marking the beginning of our second decade as the only national competitive grants program in sustainable agriculture, we celebrated by helping host a national conference in Austin, Texas. Nearly 500 people attended the March 1998 meeting to share results of research, learn from workshops and discussions, and network with farmers, researchers, educators and others who have fueled and continue to drive the sustainable agriculture movement. More than one-third of the conference participants came from the North Central Region, and NCR SARE sent 45 discussion leaders, 48 posters and displays, and 57 attendees on travel scholarships, including 25 regional farmers. Our Technical Committee and entire staff also attended the successful event.

Marketing was a hot topic at the anniversary event. With momentum created by the 1995 NCR SARE Marketing Committee, we continued exploring ever-important marketing issues through grants this year, on topics such as consumer education, value-added processing, and legal aspects of direct marketing. The NCR SARE Administrative Council awarded ten 1998 grants to special marketing projects around the region, including development of a tomato cooperative in Kansas, educating consumers about sustainable agriculture in Wisconsin and urban/rural partnerships in Ohio. (See abstracts from the marketing projects throughout the Research and Education grant section, beginning on page 13.) In addition, we will be holding a special marketing conference in November 1999 to help farmers and ranchers develop alternative marketing skills and cultivate supportive relationships.

Regional producers helped us prioritize marketing issues; they also assisted the NCR SARE program by responding to a Producer Grant Program evaluation survey. The North Central Region put in place SARE's first granting program exclusively for farmers and ranchers in 1992. In January 1998, researchers from Michigan State University began mailing a survey to past producer grant recipients and applicants. As a result of follow-up phone calls and site visits, more than 600 farmers and ranchers voiced opinions about their views on sustainability, the Producer Grant Program application and award process, impacts of producer grants, resulting outreach activities, information sources on sustainable agriculture and general opinions of the Producer Grant Program. A committee from our Administrative Council, led by our producer liaison Ken Schneider, met to incorporate information gleaned from the survey to improve the popular Producer Grant Program.

Thank you, Administrative
Council, Technical
Committee and other NCR
SARE participants and
partners!

Nineteen ninety-eight brought 80 new grants, at a total of more than \$2 million, into our growing portfolio of projects. We awarded 20 Research and Education grants totaling more than \$1.2 million, 10 Professional Development Program (PDP) grant awards totaling nearly \$400,000, and 46 new Producer Grant awards totaling more than \$220,000. The Research and Education Grant Program projects include our 10 marketing initiatives and studies and education in biological control of bacterial diseases, soil quality and cover crops, farm mentorships, youth involvement in water quality issues, agroforestry and management-intensive grazing, and holistic management principles, among other topics. Regional farmers and ranchers will be exploring a host of issues with Producer Grants; such as honey bee varoa mite control, sustainable hog production, marketing organic livestock, alternative nitrogen sources, and composting. We also continued our relationship with our Native American communities through grant awards and other initiatives. Look for results of these and other new projects in subsequent reports. In fact, look for SARE results on the national SARE project database at www.sare.org.

In addition to competitive grants, NCR SARE provided \$12,000 to each NCR land-grant university for state initiatives in sustainable agriculture education, including meetings, newsletters, workshops and websites. George Bird left his post as PDP coordinator in August, leaving regional extension coordinator Elbert Dickey to direct the program while the Administrative Council searched for a new coordinator. Dickey also embarked on an educational needs assessment survey of regional leaders in the Natural Resources Conservation Service and Cooperative Extension. Responses to the survey were used to determine PDP grant priority areas, and to hire a new PDP Coordinator, responsible for networking and sharing information with our regional educators. This year was also the last for our regional educational workshop — the North Central Sustainable Agriculture Training Project. (See the four-year summary beginning on page 155.)

The NCR SARE program continues to offer services and communication vehicles such as our website, speakers bureau funds and traveling display. In addition, the NCR SARE program began publishing a newsletter/fact sheet series in August 1998. The six-page quarterly publication includes *Field Notes* — an article about a different sustainable agriculture topic each issue, highlighting various NCR SARE findings and project coordinators and providing further information on the topic. Also included in the publication is a two-page newsletter — *Program Notes* — sharing news and announcements from NCR SARE.

At our national headquarters, Jill Auburn's first year as SARE's director was commendable. Her dedication to sustainable agriculture and SARE has already made a mark at the USDA. In fact, with Auburn and the national SARE staff's leadership and our grassroots support, USDA Secretary of Agriculture Dan Glickman said that expanding sustainable agriculture research is a USDA priority.

With momentum created by the 1995 NCR SARE Marketing Committee, we continued exploring ever-important marketing issues through grants this year, on topics such as consumer education, value-added processing, and legal aspects of direct marketing.

Defining Acronyms

Below is an explanation of acronyms most frequently used in this report.

| | |
|-------------|--|
| USDA | U.S. Department of Agriculture |
| EPA | U.S. Environmental Protection Agency |
| SARE | USDA Sustainable Agriculture Research and Education program |
| SAN | Sustainable Agriculture Network, SARE's outreach arm |
| NCR | North Central Region (12 states defined by SARE) |
| ACE | Joint USDA/EPA Agriculture in Concert with the Environment Program |
| ANC | Notates ACE-funded Research and Education grant projects in the NCR |
| LNC | Notates SARE-funded Research and Education grant projects in the NCR |
| FNC | Notates SARE-funded Producer grant projects in the NCR |
| PDP | SARE Professional Development Program |
| ENC | Notates SARE-funded Professional Development Program projects in the NCR |
| CES | USDA Cooperative Extension Service |
| NRCS | USDA Natural Resources Conservation Service |
| ARS | USDA Agricultural Research Service |
| ANR | USDA/CES Agriculture and Natural Resources program leaders |

Research and Education Grant Program

... agriculture, overall, has been and now is many times more sophisticated a venture than space travel could ever become ... partly perhaps because it comes out of living nature and is therefore complex, and partly because more human minds have worked on ways to generate an assured food supply than on any other task.

-Wes Jackson

Many agricultural researchers today acknowledge Wes Jackson's connection between "living nature" and what we eat, generating ideas on environmentally sound, economically viable, socially responsible agricultural systems. SARE supports these innovators with competitive Research and Education grants.

"SARE has helped my organization to present and develop projects that are not easily addressed by other funders," said Wyatt Fraas, of the Center for Rural Affairs in Nebraska. "SARE's recognition of the integration of society, the environment and economics is unique among funders and has led the way in the USDA."

The NCR SARE program has awarded more than 200 Research and Education grants worth more than \$13 million since 1988, when SARE began. In 1998, NCR SARE awarded 20 grants, totaling approximately \$1.2 million. Grant awards in 1998 focus on establishing farmer networks, studying the potential of biological controls, examining factors affecting soil quality, demonstrating benefits of alternative livestock systems, and supporting a variety of innovative marketing initiatives, among other projects.

The Research and Education section of this report features abstracts from grant awards that were "active" in 1998. Projects are generally funded for two years, with some no-cost time extensions. Some abstracts, labeled "New Projects", are actually proposals of what's to come. Others, called "Annual" or "Final" reports, are abstracts of what's resulted from grant funds in the prior year or the life of the project, respectively. "Interim" reports are abstracts explaining project results prior to the availability of Final Reports. All abstracts were written by project coordinators. This year, we have made special notation of our Special Innovative Marketing Grants, awarded as a result of NCR SARE's focus on marketing issues since 1995. The NCR SARE office can share full project reports, if available, upon request. Contact information is also included for project coordinators in order to foster networking and further outreach of project results.

In addition to receiving SARE funds noted with each abstract, project coordinators have matching contributions. Successful projects generally have a high ratio of matching funds; collaborative, multi-disciplinary teams; participation of producers; a focus on farm profitability; holistic goals; measurable end results and innovative outreach components.

WHO:

Teams of researchers, educators, nonprofits, producers and others.

WHAT:

Competitive grants to examine sustainable agriculture, from \$10,000 to \$100,000.

WHEN:

Call for Preproposals - JULY; Preproposals due - SEPT.; Invitation for Proposals - DEC.; Funds available - SEPT.

WHERE:

North Central Region

Research & Education Grants

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Nutrient and Pesticide Loads in Subsurface Drainage from Organic and Conventional Cropping Practices

New Project, Proposal

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Funding:
SARE: \$104,777
Match: \$91,451

Duration:
August 1998 - July 2000

The first objective of this project is to quantify and compare the quality of subsurface drainage water leaving fields under certified organic crop management with drainage water leaving fields under more conventional corn-soybean cropping practices used in central Illinois. Water samples will be collected from existing drainage "tiles" or tubes and the specific water quality parameters that will be measured are concentrations and loads of nitrogen, phosphorus and herbicides. The second objective is to incorporate the information from the monitoring phase of the project into ongoing research and outreach efforts aimed at improving water quality in agricultural settings.

We will continuously monitor water flow and periodically collect water samples from three pairs of subsurface drain tiles in southern and central Illinois. Each pair of fields will consist of one field that is certified by the Illinois Organic Crop Improvement Association (OCIA) for production of corn and soybeans (in addition to small grain, green manure and/or forage) and another field within 3 km with similar soils that is conventionally fertilized and managed for corn and soybean production (the most common crop rotation in the region). Water samples will be analyzed for electrical conductivity, total suspended solids, ammonia, nitrate, total Kjeldahl nitrogen, total organic carbon, filtered and unfiltered orthophosphate, total phosphorus, atrazine, alachlor, and metolachlor. These samples will be analyzed using standard methods outlined by the Environmental Protection Agency. Cooperating farmers will provide information about production inputs and crop yields for these systems.

The results will be integrated with existing outreach efforts in Illinois by disseminating results through the University of Illinois Agricultural Experiment Station and Cooperative Extension Service. Additionally the results will be communicated to farmers and the general public with the assistance of the Illinois Cooperative Extension Service, the Illinois Association of Soil and Water Conservation Districts, the Illinois Stewardship Alliance, and the Illinois OCIA. Outreach activities will include press releases, presentations at on-farm field days and scientific meetings, and reports and articles prepared for scholarly journals and the popular media.

The role of the farmers in this effort has been and will be to provide information on the location of suitable tile drains, and to provide information on the management of the fields draining to the tiles. The results of the study will be shared with these farmers on a semi-annual basis and their reactions will be solicited. The farmers' involvement and suggestions for outreach venues will also be solicited. Five cooperating farmers have approved of the installation of the proposed monitoring equipment on their fields.

continued ...

Nutrient and Pesticide Loads in Subsurface Drainage from Organic and Conventional Cropping Practices

... continued

Because of the reduced nitrogen input and the increased carbon input to the organic systems relative to the conventional systems, we expect to measure lower nitrate concentrations in the tile drainage from organic fields most of the time. We expect little difference in phosphorus concentrations, and lower herbicide concentrations in drainage from the organic fields. Our preliminary results, based on 54 grab samples collected in 1997, are consistent with our expectations for nitrate and phosphorus. Herbicide concentrations for all systems have been less than 1 part per billion in all but one sample, and in some organic systems we consistently detect herbicides at this low level. This may be a result of spray drift, herbicide residues in rainfall, and/or herbicide residues in the soil from previous management practices.

Multiple-Use Borderlands: An Education and Demonstration Project

Interim Report

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Funding:

SARE: \$83,832
Match: \$59,589

Duration:

September 1996 - August 1999

The overall objective of this project is to encourage the use of innovative plantings and designs for borderlands such as filterstrips, shelterbelts, windbreaks, right-of-ways and roadsides, as well as ditch banks and fence rows. The project is focused on SARE priority areas such as environmentally sound practices, emerging issues and developing marketing for crops from income-producing borderland plantings. A multi-disciplinary group of scientist is interacting with farmers and private sector specialists in a four-phased approach to addressing the issue of borderlands and their potential for not only ecological remediation, but also multiple-use and income-producing alternatives. The project is moving forward in four phases with Phase One and Two near completion and Phase Three to be completed in 1999.

The objective of Phase One is to focus on information gathering through the establishment of a researchers roundtable to identify and prioritize alternatives, a producers roundtable to identify constraints, concerns and preferences, and finally a combined workshop to broaden the perspectives of both researchers and producers. Much of this has been completed through interviews, meetings and literature searches resulting in several unique possibilities. Work on this phase will continue throughout the life of the project.

Phase Two has involved the development of numerous prototype designs of borderlands combining concepts from both research and producer groups. With input from participating scientists and farmers, landscape architecture collaborators have illustrated concepts and designs for specific on-farm demonstration sites to be installed in Phase Three of this project. Much of this material will also be used in educational materials to be developed in Phase Four.

Phase Three has begun with the partial installation of 10 on-farm demonstration sites in diverse areas of Indiana, four at Purdue Regional Research Farms and six at selected farmer locations, which provide the best opportunities to illustrate innovative designs and are accessible to a broad segment of the agricultural community. These demonstration sites will also provide sites for future evaluation to determine the effectiveness of given designs as well as potential problems.

The objective of the fourth and final stage of the project is to assemble a slide and video presentation to help audiences envision multiple-use borderlands and a publication to be used as a decision-guide to assist landowners and land-use professionals in determining which combination of borderland plantings are most appropriate for their specific situation. These educational materials will be available for broad distribution within the North Central region.

Evaluation of Composted Manure as a Growth and Delivery Substrate for the Biological Weed Control Agent *Gliocladium virens* in Sustainable Vegetable Production Systems

Interim Report

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Funding:

SARE: \$70,000
Match: \$35,851

Duration:

October 1996 - September 1999

The overall objective of this research is to develop an efficient system for growing the fungus, *G. virens* so it can be delivered to agricultural fields as a biological weed control tool. Specific objectives of the grant are: 1) use Composted Chicken Manure (CCM) as a substrate for growth and delivery of the weed biological control agent *G. virens* in sustainable vegetable production systems; 2) use an annual rye cover crop (*Secale cereale*) in association with *G. virens* as an alternative to conventional herbicides in vegetable production systems; and 3) assess the effectiveness of these environmentally friendly production systems and disseminate information to the farming community.

During this project studies were initiated in the laboratory, greenhouse and field to address the specific objectives. Initial studies were conducted in the laboratory to develop a method by which the inputs and time required to inoculate and deliver the fungus in an active form to the field could be reduced. Results showed that the required nutrients and carbon source necessary for the fungal growth on the CCM could be reduced by one-half, that the required incubation time prior to field delivery could be reduced from 28 to seven days and that there is no need for sterilizing the CCM prior to inoculation with the fungus. These findings will help provide reduced cost of mycoherbicide preparation and greater flexibility in preparation of the substrate for field delivery.

In addition to the substrate preparation studies, field experiments were conducted in tomato, pumpkin and snap bean, over a two-year period, to assess the potential of the mycoherbicide as a weed control agent. The studies showed that the mycoherbicide does have activity under field conditions. When compared with conventional herbicides, the fungus can provide acceptable weed control of broadleaf species but is weaker on grass. The activity of the fungus was better in the early season (in tomatoes) prior to extremely hot temperatures and was less active in warm season crops, such as snap bean and pumpkin each year of the studies. Results are promising for the potential use of this biological weed control agent. Prior to commercialization of this mycoherbicide, additional formulation research will be necessary to ensure better consistency of action in the field. We found that environmental conditions at the time of and immediately after application greatly influenced the level of weed control obtained and influenced fungal growth.

Development of Market Infrastructure to Support Local and Regional Food Systems

Annual Report

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Funding:
SARE: \$86,200
Match: \$52,700

Duration:
July 1997 - July 1999

Of the many ways to build community food systems, different strategies were developed at the sites targeted in this project. Common to all was the goal of developing new marketing opportunities for farmers wishing to direct market farm products. It is equally vital to educate consumers about the value of fresh, locally grown food. All strategies for implementation of these projects have focused on the development of local commitment for a long term project life.

In Indianapolis, an inner city neighborhood was targeted because such populations typically do not have access to fresh produce yet represent a great potential as customers for market farmers. The Mapleton-Fall Creek Neighborhood, an inner city neighborhood with deteriorated housing and few business activities, 30 blocks north of downtown Indianapolis, was selected because of the partnerships that could immediately be formed.

Important elements were an active neighborhood association and a church which was beginning a neighborhood gardening project with assistance from the community gardening specialist from cooperative extension.

A steering committee was established and met twice monthly throughout the summer to guide the project's progress. Efforts were directed toward the establishment of organic market gardens and a farm stand operated by minority youth. Organic production was the wish of the church participants. It was also a way to differentiate the market, so as to draw customers from outside the immediate neighborhood.

Five lots were obtained for back taxes (\$900), much less than annual rent on similar lots. White picket fences were built around the properties, the soils were amended with composted chicken manure and topsoil, then plowed and rototilled. A supervisor and two neighborhood teenagers were employed full time for the growing season. They grew vegetables and marketed them at a youth farm stand on a corner lot each Saturday morning until the middle of September.

The presence of the farm stand as part of a Good Neighbor Fair sponsored by the neighborhood association increased attendance at the event. To increase awareness of the farm stand, the employees distributed flyers door-to-door in parts of the neighborhood each week. The market was certified by the Women, Infants and Children (WIC) Farmers' Market Nutrition Program and coupons were redeemed each week for fresh produce.

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Development of Market Infrastructure to Support Local and Regional Food Systems

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The youth farm stand concept attracted additional funds from the Natural Resources Conservation Service as well as a foundation and local businesses. Profits from the stand were used to employ other neighborhood youth on a casual basis.

In the Fort Wayne area, a regional sustainable farming and marketing organization was developed. Members represent 35 farms from seven counties, all producing differentiated products from natural beef and pork to vegetables and herbs. This group has a five-member steering committee and has chosen the name of S.A.F.E. - Sustainable Agriculture For Everyone.

The model being developed is that of a foodshed, with Fort Wayne as the target market for the region. Discussions about marketing farm products have been held with a regional supermarket chain operating 30 stores in the region. Current activity involves the development of a market label, a structured marketing group, and a new farmers' market.

Concepts for other Fort Wayne project components have progressed to the implementation stage. An established minority youth garden and market project was given assistance with soil amendments and signage to move that project forward. A market gardening project associated with a disadvantaged group will begin in the spring.

Traveling Food Processing/Educational Trailer

New Project, Proposal
SPECIAL INNOVATIVE
MARKETING GRANT

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Funding:
SARE: \$41,138
Match: \$45,940

Duration:
August 1998 - July 2000

Objectives of this project include: 1) to increase the markets and incomes of small organic growers, 2) to connect small organic growers to local markets, 3) to educate local consumers about the availability of local organic produce, 4) to form small cooperatives of growers that will share processing facilities and marketing opportunities, and 5) to educate groups of small growers about safe food handling and processing.

We will buy and equip a food trailer that could be used as an traveling catering vehicle, a food processing facility, and a traveling advertising vehicle. With the trailer, we can travel from county fair to county fair or other mainstream events to prepare organic meals from local growers using their produce, and to hand out information about the growers in the area. By holding workshops in the trailer with food safety educators, we can help growers learn how to process food safely for serving as meals and for freezing and packaging.

In addition, we will compile guides to tell where the growers are, what they produce, and how to contact them. We will also hold workshops with food industry personnel to inform growers about licensing issues, regulations, labels, weights and measures, sales tax, and product liability issues and we will provide producers with a guide from the Food Industry Institute at Michigan State University about how to set up a business, food issues around processing, contact people, advertising and promotion, record keeping, pricing, etc.

We expect that this project will increase: local markets, income for small growers, consumer awareness of local producers, grower knowledge of food handling and safety, grower knowledge of marketing strategies, and grower knowledge of processing.

Soil Quality Improvement with Cover Crop Mixtures

New Project, Proposal

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Funding:

SARE: \$93,256
Match: \$30,045

Duration:

August 1998 - July 2000

Objectives of this project include: Evaluating the potential for cover crop mixtures to improve soil structure, microbial biomass and diversity, and nutrient conservation and availability on four Indiana soils under no-till and conventional tillage systems and a corn/soybean rotation; Determining the impact of cover crop mixtures on corn and soybean yields and weed suppression on four Indiana soils under no-till and conventional tillage systems; and Evaluating and demonstrating cover crop mixtures and the resulting soil quality changes on four producers' fields in Indiana.

A two-year field study will evaluate cover crop growth in a corn/soybean rotation (the most common cash-grain system in Indiana) grown under no-till and "conventional" tillage systems. The first two objectives will be carried out on four Purdue University research farms spanning a range of soil types and latitudes within Indiana. The study was begun on three of the four locations in autumn 1997, with partial matching funding from Purdue Agricultural Research Programs.

Selection of the cover crops was made from a suite of cover crops representing different root system morphologies. The seven cover crops considered were forage turnips, winter canola, buckwheat, cereal rye, annual ryegrass, winter wheat and winter barley. Our philosophy was to select plants with different root system morphologies in order to obtain the combined benefits of shallow or fibrous rooting on soil structure near the surface, and deep rooting on soil structure deeper in the profile. In this way we may be able to better mimic the soil benefits of longer rotations while still maintaining the economic benefits of shorter rotations. The specific cover crops chosen were different for northern and southern Indiana based on crop adaptability to both the climate and the soils. Combinations chosen were canola and rye for the Pinney and Agronomy Research Centers, and forage turnips and wheat for the Throckmorton and Southeastern Research Centers.

Measurements for soil structure will include aggregate stability twice each season and infiltration once each spring. Soil moisture content will be measured several times in spring during the cover crop growth period and for several weeks after planting the cash crop. Soil bulk density will be measured to assess total porosity and to convert moisture content values to a volumetric basis. Cover crop biomass yield will be measured prior to planting the cash crop. The degree of weed suppression will be evaluated by weed counts made four to six weeks after planting. Final yield of the cash crop will be measured.

continued ...

Soil Quality Improvement with Cover Crop Mixtures

... continued

Soil nutrient and biological analyses will be performed on soil samples collected in the spring prior to cover crop kill date, during the growing season, and after harvest of the cash crop. Nutrient analyses will include soil N at all sampling dates and P, K, and organic matter once each season. Microbial diversity will be assessed using DNA fingerprinting techniques for the spring and summer sampling dates. Total N uptake by the cover crop will be measured in the spring, and macronutrient content of the cash crop will be analyzed in mid-season.

Research/demonstration plots will also be established on three cooperating farms in west-central Indiana. All cooperators will have a control (no cover) and at least one mixture (forage turnips and wheat, for example). In addition, each of the farmers will include several other mixtures of particular interest to them. The purpose of these trials is to determine some of the real-world handling challenges and opportunities in working with these cover crop mixtures. These sites are also key in the education/outreach aspects of the project, and will serve as locations for field tours. The on-farm-trials will be evaluated for cover crop growth, soil aggregation, nutrient availability, and cash crop yield.

We expect this project will identify new combinations of cover crops that will improve soil structure, nutrient status, and microbial diversity in both conventional and no-till systems. This will provide farmers with new alternatives in their quest to improve soil quality, increase diversity of plant life on their farm, and conserve the soil resource base. It will also provide important background data on microbial diversity in soils and its potential implications for agricultural sustainability. This type of data is key if we are to make best use of our biological resources in our modern agricultural systems.

Production of a Videotape Series Demonstrating Improved Grazing Practices to Promote Forage-Based Livestock Production in the Upper Midwest

Final Report

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Funding:

SARE: \$19,200
Match: \$79,376

Duration:

October 1994 - May 1997
(Report received, July 1998)

The objective of this work was to develop a videotape series demonstrating improved grazing practices particularly applicable to forage species and environmental conditions found in the Upper Midwest.

The first tape, *Introduction to Managed Grazing*, initiates the series by discussing the importance of ruminant livestock to the Iowa economy, the benefits of incorporating grazing into farming enterprises and the advantages and limitations of utilized managed grazing practices. The second tape, *Pasture Plants*, describes methods of improving pasture productivity by considering the effects of grazing intensity on photosynthetic capacity through leaf area and nutrient absorption through root growth and the habit and management of growth in the forage species found in Midwest pastures. The third tape, *Animal Management*, describes the technical aspects of managing a controlled grazing system including the determination of stocking rates and the size, number, shape and placement of paddocks needed to optimize profitability of different livestock enterprises and also placement of water systems, gates and milking facilities, management of reproduction and internal parasite control. The fourth tape, *Fencing and Watering Systems*, describes the options in fencing and watering equipment currently available and the considerations in the proper use of this equipment for a managed grazing system. The final tape, *Year Around Resource Management*, describes the productivity and nutritive value of forage resources available for grazing in the different seasons of the year and methods of matching the numbers, genetics and management of beef cows, beef stocker steers, dairy cows or ewes with the forages available for grazing in each season to optimize enterprise profitability.

These tapes were distributed to the county extension offices in Iowa and have been sold at a nominal charge to 410 individuals since their release.

As a supplement to the videotape series, a book entitled *Pasture Management Guide for Livestock Producers* has been prepared. The book consists of five sections: 1) Managing Pasture Plants discusses the characteristics of forage species common in the Midwest, the mechanism and control of plant growth in grazing systems, and different pasture weed control, fertilization, management and renovation strategies; 2) Livestock Management discusses the nutrient requirements of different species and classes of grazing animals as affected by physiological state, health problems associated with grazing systems, management of reproduction or milking in grazing systems, fencing and watering options and the need and use of other feed resources to supplement grazing animals; 3) Planning for Improvements in Grazing Systems discusses the integration of plant and animal resources to optimize grazing both during

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Production of a Videotape Series Demonstrating Improved Grazing Practices to Promote Forage-Based Livestock Production in the Upper Midwest

... continued

the summer and winter, calculation of present carrying capacity using forage mass and intake and seasonal carrying capacity using the soil types within the pasture; and paddock layout; 4) Monitoring and Evaluating the Grazing System discusses the type of records needed to register production and management decisions and to plan future management of feed and animal resources; and 5) Managing Risk in Grazing Systems describing the integration of pasture management systems within the level of risk acceptable to the producer. Examples of worksheets to calculate the number and/or size of paddocks or the carrying capacity of pastures are included. This book will be offered through Iowa State University extension at a nominal charge.

In a survey of county extension offices in Iowa in 1996, it was found that the one or more of the videotapes in the series had been signed out by 0 to 14 individuals. This means that at least 700 individuals had seen the videotapes. However, since it is likely that some of the individuals who took out the tapes used them for educational purposes, the number of people who actually saw the tape may have been 5 to 10 times greater. Furthermore, the tape series has been sold to 410 individuals across the country and, since many of these individuals are educators and extension personnel, it has been seen by many other individuals.

The Adams County CRP Research and Demonstration Project

Final Report

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Funding:

SARE: \$50,000
Match: \$168,000

Duration:

September 1996 - August 1998

The objective of the Southern Iowa Forage and Livestock Committee (SIFLC), which was established in 1989 as a cooperative effort between area farmers, local business people, the Natural Resources Conservation Service (NRCS), Iowa State University (ISU) extension, Rural Economic and Community Development (RECD), and Farm Services Agency (FSA), is to demonstrate an economically feasible and environmentally sound alternative to row crop production on highly erodible marginal land, regardless of whether the current land use is CRP, cropland, or pasture. We are demonstrating and implementing grazing systems and forage production on highly erodible marginal land as an alternative to row crop production. Education of landowners and operators, business people, students, and government agency personnel are key to this project.

SIFLC demonstrates management-intensive grazing using beef cattle as an alternative to row crop production. The project consists of a farm in south-west Iowa currently enrolled in CRP made of class IV land with a CSR average of 34. Three different grazing systems established on the farm utilize contour lane systems to move cattle and reduce erosion in the lanes, high-powered New Zealand-style electric fence and several types of watering systems. The fence is powered demonstrating the use of solar power and REC Hi-Line. Four different water systems are demonstrated on the farm: gravity flow, electric pumps using solar and REC Hi-Line, and cattle powered "nose" pumps. This farm demonstrates concepts that producers can use to implement intensive grazing systems on their land. ISU furnishes cow/calf pairs and "stocker steers" for the grazing systems. These cattle are utilized to demonstrate economic profitability verses row crop production. Forage interseedings and their benefits have been of special interest to farmers. We have been able to demonstrate the economic and environmental benefits gained. Producers can put this information to work through the use of our Great Plains No-Till Drill that is made available in Southern Iowa to rent for interseeding and establishment.

The information created by this project is disseminated to our target audience through field days, county level pasture management meetings, open houses, grazing seminars, farm tours, speaking engagements, annual reports, and articles in newspapers, trade magazines, and scientific journals. Our two-day Grazing Clinic held in June of each year is important because it is the only seminar of its kind held in Iowa. Participants attend gaining knowledge from the classroom as well as seeing and participating with a "hands on" approach at the demonstration farm. We are aware of 24 who have adopted the grazing system technology on their farms. These producers have divided their land into three or more paddocks. The majority have been divided into five or more. They have experienced an increase of cattle gain per acre as well as requiring less herbicide to control weeds.

Integration of Local Knowledge of Sustainable Agricultural Systems

Final Report

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Funding:

SARE: \$15,000
Match: \$515,580

Duration:

September 1996 - August 1999

The North Central Region SARE program has awarded more than 250 research grants to farmers in the North Central region since it initiated its Producer Grants Program in 1992 to support farmer inquiries on agricultural issues of direct relevance to their production enterprises. It is plausible that grant recipients have generated and accumulated a store of experiential/local agricultural knowledge from their activities, the cognitive dimensions of which can serve both current and future communities of farmers shifting from standard to sustainable alternative systems of farming. It is also important to understand how the local knowledge generated from farmer experience moves from local arenas of creation to wider social contexts for sharing and dissemination.

Farmer collaborative inquiry with researchers is also at the heart of the SARE Producer Grant innovative initiatives. Thus understanding the outputs and outcomes of different patterns of collaboration between farmers and researchers can considerably enhance the development of strategic collaborative partnerships at the local level that "work" in reaching farmers' goals and resonating with their interests.

Results of the qualitative thematic analyses of 68 annual/final reports of SARE grant recipients show that: 1) The driving force behind SARE farmer local actions and farming practices fall into three distinct but overlapping categories or values: economic viability, environmental stewardship and social sustainability; 2) SARE farmer researchers' reports show innovative practices and alternatives, such as management-intensive rotational grazing, integrated pest management and nutrient recycling through creative manure management strategies are being tested and adopted in the North Central region production systems; and 3) SARE farmer researchers' see the Producer Grant Program as a strategic risk insurance that provides a measure of financial support as they test non-traditional innovative technologies, while shifting from a conventional technology treadmill to an alternative approach to agricultural production.

Institutional collaboration and different patterns of participation with farmers appear in the reports less often as conduits for knowledge transfer than as intellectual/cognitive spaces for selectively melding knowledge from multiple arenas to fit specific contexts and special needs. Four models of collaboration and participation are identified in SARE farmers' reports. SARE farmer researchers also identify various avenues of communication, sharing and dissemination of their local experiential knowledge. These include field days, pasture walks, sustainable agriculture organization newsletters, workshops, and community newspapers.

continued ...

Integration of Local Knowledge of Sustainable Agricultural Systems

... continued

An important implication emanating from the interpretive analyses of SARE farmers' reports is that there may be greater space in the agricultural landscape for an alternative approach to agricultural production to expand than has been hitherto realized. The study suggests that for any alternative approach to influence cognitive changes on farm, system wide changes are required that support individual innovation and creativity. It further challenges public institutions to support changing and emergent values among farmers to sustain that innovative and creative synergy at the farm level.

Combining Landscape and Augmentative Biological Control to Suppress European Corn Borer (ECB) Populations in Sustainable, Low-Input Systems

Annual Report

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Funding:

SARE: \$92,740
Match: \$40,400

Duration:

July 1997 - July 1999

Objectives of this project include: 1) Determine which agronomic crops and erosion-control plants best stimulate European Corn Borer (ECB) oviposition, 2) Assess ECB control in corn when egg parasitoids are inoculated into moth aggregation sites, and 3) Extend ECB management methods to growers through on-farm field days, local grower meetings, and extension publications.

Aggregation sites were established to attract ECB for egg laying. Once oviposition had occurred an egg parasitoid, *Trichogramma brassicae*, was to be released in these plots. The premise being that *T. brassicae* would parasitize ECB eggs, complete a life cycle and disperse into adjoining corn, and parasitize any available ECB eggs. To accomplish this plots of Bay Oats, 1.5 x 152.5 m, were planted April 23, 1998 to attract the first flight of ECB. To attract the second flight of ECB proso millet and foxtail millet were planted June 25, 1998 in similar sized plots. These plots were established at six separate sites surrounding corn fields on a research farm at Ankeny, Iowa

During the spring of 1998 in central Iowa the ambient temperatures during day and night never exceeded 14° C. These temperatures are not adequate for moth flight and oviposition. This weather phenomenon resulted in a low to zero population of ECB. This extremely low population during first flight resulted in a correspondingly low population during second flight. Thus, we did not have ECB pressure sufficient to complete the objectives of the research. The oats and millets, however, produced dense vegetation which will definitely attract ECB adults if the insects are present.

The use of aggregation sites to attract adult ECB and to develop a "nursery" of egg parasitoids, has the potential to provide corn growers with a sustainable tool for managing this important pest of corn.

Producer-Owned Cooperative to Process and Market Sustainably Produced Pork

**New Project, Proposal
SPECIAL INNOVATIVE
MARKETING GRANT**

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Funding:

SARE: \$23,590
Match: \$24,190

Duration:

August 1998 - July 1999

Markets for sustainably produced meat products are essential to integrated crop and livestock farming systems. Many consumers are interested in meat products raised in ways that they perceive will enhance their personal health, animal welfare and the natural environment, but are usually unable to easily obtain products meeting these criteria. The rapidly growing consumer interest in leanness, absence of synthetic hormones, and conservation of natural resources creates new opportunities to provide premium prices to reward innovative environmental stewardship and to enhance economic opportunities in farming and rural communities.

Many farmers are producing pork that would appeal to consumers with these interests. However, current market structures do not favor these products or reward farmers with the premium prices that the marketplace has great potential to provide. On the contrary, moderate-sized, diversified farms are often penalized with lower prices when modest quantities of a commodity are sold, because most slaughtering, processing and marketing businesses offer premiums for a large quantity sold at one time.

This project will help farmers establish a cooperative to process and market sustainably produced pork to consumers seeking healthy foods produced under environmental stewardship. Cooperative owners will overcome the barriers, especially the limited processing and marketing opportunities, to marketing sustainably produced meat products. It will create a model that other groups of farmers may replicate to market their sustainably produced meats.

The Center for Rural Affairs will provide support and expertise to farmers to develop the structure for a farmer-owned cooperative to process and market pork products. This cooperative will: increase opportunities for small- and moderate-scale, owner-operated farms, especially beginning farmers; enhance the economic viability of small- and moderate-scale, owner-operated farms; improve profitability of environmentally sound livestock production systems as a means to reward resource stewardship; increase consumers' access to pork produced with environmental responsibility; and help prevent further livestock industry concentration.

continued ...

Producer-Owned Cooperative to Process and Market Sustainably Produced Pork

... continued

The Iowa Farmers Union and Center for Rural Affairs will provide leadership to a steering committee of approximately eight farmers, in addition to representatives from various sectors of the meat industry, such as processors, distributors, wholesalers, and/or retailers. This steering committee will lay the groundwork for a cooperative to process and market meat products. It will recruit farmers to become member-owners, design a cooperative structure, establish criteria for membership and products, and identify opportunities for slaughtering livestock and processing the meat products.

The cooperative will establish the organizational structure for a cooperative to market sustainably raised pork. This will be based on analysis of opportunities and barriers to slaughter, process and market hogs. It will include criteria for membership, types of pork (breeds, production methods or other standards), and strategies for obtaining the necessary market and feasibility analysis.

Soil Fertility Paradigms Evaluated through Collaboration On-Farm and On-Station

New Project, Proposal

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SUPPORTING ORGANIZATIONS:
Practical Farmers of Iowa

Iowa Organic Crop Improvement
Association, Chapters 1 and 2

Funding:
SARE: \$59,027
Match: \$66,256

Duration:
August 1998 - July 2000

Within sustainable agriculture, two contradictory approaches to soil fertility uneasily coexist – the Cation Ratio paradigm (CR) and the one referred to as “Sufficient Level of Available Nutrients” (SLAN). There is little communication between the two camps because they use different terms and conceptualize fertility differently. SLAN proponents, and this now includes all of the U.S. land grant universities, concern themselves with whether the soil contains *enough* of each nutrient in forms that are available to the crop. In contrast, the CR approach looks not at the gross amounts of available nutrients but the *proportions* in which they are represented on the soil cation exchange. It is the farmer who is forced to integrate these two information streams and make the financial judgements required in farm management. Sustainable agriculture must deal constructively with this schism if it is to grow in credibility and relevance.

We will initiate a process, one involving stakeholders on both sides of the question, to compare the economic and agronomic consequences of these two philosophies. We will implement a series of side-by-side comparisons of the two management styles. Both approaches will be accurately and credibly represented.

Research sites will consist of two ISU experiment stations and six farms: two organic, two transitional-to-organic, and two farms that use synthetic production inputs in a sustainable manner. Project collaborators include the two primary sustainable agriculture organizations in Iowa: Practical Farmers of Iowa and the Organic Crop Improvement Association. Based on the two approaches to fertility, two sets of recommendations will be generated for each site, with materials applied accordingly in replicated plots, six replications per site. The project will focus on selected crop and soil parameters chosen to reflect impacts of the two systems on grain quality, soil quality, and soil biological activity. Crop production and profitability will be monitored for each site and for the study overall, as will crop quality and soil physical, chemical, and biological indicators. After each cropping year, farmer-scientist roundtables will take place in public producer meetings to discuss findings and their significance.

continued ...

Soil Fertility Paradigms Evaluated through Collaboration On-Farm and On-Station

... continued

The project will monitor the following crop and soil quality parameters in the two comparison systems: grain yields and moisture, population, grain crude protein, ADF, TDN, net energy, 10 minerals (grain), soil aggregate stability, bulk density, soil particulate organic matter and microbial biomass, soil P₁, P₂, K, Mg, Ca, S, Zn, Mn, Fe, Cu, B, OM, pH, buffer pH, and corn nitrogen status through the late spring soil nitrate test and end-of-season stalk nitrate test. Indicators beyond gross yield are sometimes diagnostic of hidden problems, especially in the CR approach. Further, they may be indicative of soil quality benefits that are not reflected in crop yields or profits, at least in the short term. Failure to include a range of these indicators would be to ignore the fact that the two sides of this controversy “speak different languages” and that they focus on and value different characteristics in crops and soils.

The project is designed to draw the interest of producers and others in the sustainable agriculture community and to maintain their involvement as project results unfold. The six farm sites and two experiment station sites will attract attention in their communities. Each site will host a field day each year, which will be promoted with press releases targeted to local media, a statewide guide to PFI field days, the PFI newsletter, and several statewide agricultural publications.

The proposed project will: 1) stimulate critical examination of the differences between and relative merits of the two contrasting philosophies of soil fertility – SLAN and the CR approach; 2) document, for 16 site-years, crop production and profitability using recommendations based on these two divergent paradigms; and 3) determine the effects of these two management systems on crop characteristics, and on soil physical, chemical and biological parameters that may affect soil quality and sustainability of the agroecosystem.

Farmer-to-Farmer Cover Crop Network Complementing On-Farm and On-Station Trials

Final Report

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Covered Acres Cluster

Funding:
SARE: \$46,954
Match: \$63,378.

Duration:
October 1995 - March 1998

A network of farmers and researchers shared ideas, practical experiences and research information on cover crop rotations. A collaborative process established partnerships between farmers and Kansas State University (KSU) researchers on the assessment of crop productivity, soil quality, nitrogen fixation, soil water use, yield risk and economic returns with cover crops in a wheat/grain sorghum rotation. Ten farmers across two farmer clusters conducted cover crop trials on their farms with narrow, farm-scale plots. Two KSU Experiment Stations conducted complementary research. Joint visits on farms and stations gave practical assessments of the research partnership. Outreach included field days, written articles, and educational workshops.

The farmer-to-farmer cover crop network developed a better understanding of research and management guidelines on cover crops in a wheat to grain sorghum rotation. Consistent cover crop stands and weed competition emerged as a priority management concern along with soil moisture conservation.

The poor growing conditions in the fall and winter of 1995-1996 resulted in poor stand establishment of both cover crops on most farm sites. The average biomass of cover crops prior to spring tillage was less than half a ton, and the nitrogen contribution from the cover crop biomass ranged from only 2 lb/a to 71 lb/a. The resulting sorghum yields in 1996 were lower with cover crop as compared to without (20 bu/acre lower), though leaf tissue N status showed adequate levels in both treatments. Soil water measurements during the growing season indicated lower soil moisture in the cover crop plots, perhaps because of spring depletion prior to when the cover crop was destroyed.

Cover crop establishment was much better in the fall and winter of 1996-1997, resulting in an average of over a ton of cover crop above ground biomass. The range was from a low of 22 lb/a, up to 164 lb/a N from vetch. On the two farms with both cover crops planted side-by-side, the vetch produced more biomass and N than the pea.

Subsequent sorghum yields were higher in the cover crop plots in 1997 as compared to 1996, and were not significantly different than the fertilized control plots. Leaf tissue N also indicated adequate nitrogen status in both treatments. Soil water measurements in 1997 also were not different between plots. Observations by the farmer participants indicate that the timing of N release seems to be different from the cover crop as compared to fertilizer, and in some cases the sorghum plots following cover crops did not get dark green until fairly late in the season.

continued ...

Farmer-to-Farmer Cover Crop Network Complementing On-Farm and On-Station Trials

... continued

Hairy vetch at the KSU station trials provided excellent fall ground cover to provide protection from soil erosion. The average potential amount of N to be mineralized for use by the sorghum crop was 147 lb/a and 188 lb/a. In sorghum following vetch, leaf N did not increase meaningfully above an N rate of 30 lb/a. Sorghum following vetch required one to two days less time to reach half bloom than sorghum without a preceding cover crop. Averaged over N rates, sorghum yields were 6 to 10 bu/a more after vetch than where no cover crop had been grown. Highest yields were attained with an N rate of 90 lb/a in sorghum without prior vetch and with 30 lb/a of N in sorghum following vetch. The positive effect of vetch on the yield of sorghum without fertilizer N was equivalent to between 70 lb/a and 89 lb/a of N relative to termination date. A small, but significant increase in the number of heads per plant accounted for most of the treatment effects on yield.

Winter pea cover crop trials at the KSU station resulted in nitrogen credited to the cover crop up to 30 lb N/a. As with other N rate studies on the South Central Field, the first increment of fertilizer N had the greatest effect on leaf and whole plant N and grain yield.

Bioremediation of Saline Seeps

Interim Report

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Funding:

SARE: \$77,778
Match: \$82,961

Duration:

October 1996 - September 1999

Saline seeps are an increasing concern in the dryland crop production areas of Kansas. Locally known as “alkalai spots” or “slick spots,” they are areas of bare soil or reduced crop production usually located on hillsides and range in size from a few square yards to tens of acres. Seep development in this region is probably related to the shift from native grass prairie to annually cropped winter wheat. Wheat uses less water than native grass. The water not used by the crop moves downward through the soil. In sites susceptible to saline seeps, the water encounters a soil layer that directs it to a surface seep downslope from where it entered the soil. In the seep, water evaporates and leaves behind salts that were picked up along the way. Saline seeps typically go unnoticed for many years until the salt concentration in the topsoil decreases crop production. Normal crop production is possible in reclaimed saline seeps. Farming practices and crops can be modified to use water productively before it moves below the root zone. We need to allow it to heal by growing plants that use more water but still give the farmers a comparable profit. The objectives of this project are to: 1) demonstrate several practices for utilizing soil water while it is still a relatively non-saline resource in the seep recharge area, 2) determine crops and management practices that can sustainably control seeps, 3) educate farmers about causes and potential solutions, and 4) demonstrate an inexpensive method for tracking salinity and flow patterns around seep areas.

Five demonstration sites in two counties were monitored. Farmers have either implemented the new practices or are planning to implement them. For each site, surface and profile soil salinity of both seep and recharge areas were measured and mapped using computer GIS software. These data are beginning to build a database of how saline seeps respond to climate and management. In addition to food and feed crops, several crops show potential for production on lands recharging or affected by saline seeps. Switch grass has been demonstrated as a small-scale alternate energy source for schools, hospitals, and industrial processes. The economic feasibility of producing switch grass was compared to continuously cropped winter wheat and alfalfa. The net return associated with a range of yield scenarios for each crop demonstrated the economic difficulty with farmers switching to biomass energy crop production. Further, the delivered cost of energy derived from the conversion of switch grass was found to be significantly higher than the current energy source, natural gas. Economic analysis indicated that alfalfa was a competitive cropping alternative to wheat in this area.

Farmers attended a field tour at one of the project sites. Extension agents expressed excitement about this work. Each agent knew of more farmers who are seeking methods for controlling and remediating saline seeps, which reiterated to us that efforts must be continued and expanded.

Farmer Marketing Information Co-ops

Interim Report

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Funding:

SARE: \$22,390
Match: \$21,480

Duration:

September 1996 - August 1999

This project organizes farmer information co-ops for the development of farm-to-town markets. In order to better balance more ecological farming practices with farm profitability, farmers need alternative markets that help them take back the economic middle in agriculture. Four information co-ops will be organized around marketing of pastured chickens, grass-fed beef, organic grains and frozen lamb.

This project advances farmer knowledge in the marketing of locally-grown, farm-fresh products. These farmer information co-ops will be designed to overcome barriers of ignorance about consumer relations, regulations, accounting, production and processing quality control. Reaching out to other farmers who have tested and developed alternative marketing options will help build bridges over these barriers.

Participating farmers will be encouraged to gather together in homes and share a conference call line to bring long distance learning to the local community. These local group study circles participating in this long distance learning will encourage shared learning and cooperation.

These co-ops improve marketing effectiveness through mentor/apprentice relationships. Opportunities will be provided for farmers to learn first hand from the experiences of others by visiting them. They will see the potential for developing new market niches that generate more economic opportunity. This co-learning will further develop marketing skills and savvy. These relationships will also provide emotional support through the difficult task of developing a loyal customer base. The project is designed to facilitate extended learning and opportunities for building personal learning relationships that will extend beyond the life of this project.

Direct marketing management bulletins will be developed to transfer the learning from these information co-ops to the broader public. The management knowledge developed will be extended to the public through written bulletins. A draft of the grass-fed beef marketing guide is finished, and the other three marketing guides will be completed in the coming year. This will be useful to help still other farmers think about developing their own local market niche. A farmer in each information co-op will be contracted to coordinate and facilitate the calls and write the farm-to-town market bulletin.

Cluster use of Whole-Farm Planning with Decision Cases and Evaluation

Annual Report

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Funding:

SARE: \$106,400
Match: \$90,580

Duration:

July 1997 - July 1999

Our overall goal is to facilitate farmer decision-making in whole-farm planning, thus strengthening the agricultural system that supports small- and moderate-scale owner-operated farms. The scope of the project is contained within three objectives:

- 1) Farmers and ranchers will be empowered through training in whole-farm planning to manage site-specific farming and ranching methods in a holistic manner. During the first year 25 participants went through two, three-day Holistic Management (HM) training sessions. Out of this training a continuing education cluster evolved that has met on a monthly basis, moving from farm to farm.
- 2) Component farm planning tools will be evaluated for planning and monitoring effectiveness in different whole-farm planning situations. The only evaluation until now has been the HM training. Participants gave a high rating to the training. A four-month post-training evaluation showed continued energy for HM, but for those not involved in the cluster, the daily grind seems to overwhelm them. Additional tools will be evaluated during the second year of this project.
- 3) Decision cases will be developed by cluster participants for classroom and extension education. Three decision cases have been developed that look at farm management challenges different training participants encountered. One has not been used, but for the others, several on-farm class training sessions have resulted.

In the second round of training in 1999 we anticipate using participants from the first training to contribute to training sessions that will be held in six local communities.

Looking at the evaluation results and the cluster that has met since the training, impacts seem to come from the three "legs" of sustainability. Socially, those involved in cluster meetings have grown close together. Concern for community is deepened. Environmentally, as ecosystem process are better understood attempts are being made to make decisions that are more environmentally friendly. And financially, decisions are being made that are farm-profit focused and less production focused.

Yesterday's Research for Tomorrow's Needs

Annual Report

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Funding:

SARE: \$63,500
Match: \$29,228

Duration:

July 1997 - July 1999

The objective of this project is to systematically collect, select and compile the early literature on farming systems for sustainable agriculture, for easy access by farmers, extension specialists, and scientists, both in paper copy and electronically, in a searchable database.

Nine subject matter specialists were chosen to review the titles from the *Publications of the Kansas Agricultural Experiment Station 1888-1950* to pre-select the publications pertaining to sustainable agriculture. A master copy and copies were made of the "pre-selections" for the subject matter specialists and were distributed to them along with evaluation forms for final selection and rationale for selection/non-selection. All copied publications (master copies) were assigned IDs for cataloging purposes. The results were compiled in a database using Microsoft Access.

A total of 2,324 publications were reviewed, 447 were pre-selected, 317 have been evaluated, and 177 were found to pertain to sustainable agriculture. Of these 68 that had information pertaining to tomorrow's needs, 54 were recommended for digitizing, 18 required rewriting, 17 for pursuing further research.

A web site has been created (www.lib.ksu.edu/depts/issa/sare). At this website the scanned full-text historical publications pertaining to sustainable agriculture are being posted.

Our project can serve as a prototype for other states who want to survey their own historical literature and create a database. A significant outcome from this work will be to contribute to the objectives of the Sustainable and Organic Cropping Systems Task Force at KSU. This group has the objective of compiling existing research pertaining to sustainable cropping systems, identifying gaps in our knowledge, and developing original research. This project will provide this task force with the needed historical perspective.

Once complete, our website, CD ROM, and distribution of paper copies of reprinted bulletins will be monitored to determine the demand and interest in these products.

County Fair Tomato Cooperative: Developing an Organic Tomato Processing Cooperative

**New Project, Proposal
SPECIAL INNOVATIVE
MARKETING GRANT**

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Funding:

SARE: \$67,800
Match: \$58,750

Duration:

August 1998 - July 2000

The objectives of the project were developed in a focus group and further discussions with most of the major participants. Objectives include: 1) developing and testing a variety of processed organic tomato products; 2) developing low-cost equipment suitable for use with limited processing runs of tomatoes in a certified kitchen; 3) development of a suitable, legal label, together with nutritional labeling analysis; 4) development of production standards and practices to standardize farm production; 5) development of a marketing cooperative, from business plan to self-sufficient business; 6) exploration and implementation of at least three marketing channels; 7) increasing farm family income through agricultural activity and retained control of value-added processing.

The farmers involved in the project include full-time vegetable growers, organic soybean growers interested in diversifying their production into horticultural crops, and the spouses and children of other certified organic growers. They were assisted in growing their crop of processing tomatoes beginning during the summer of 1998. The production supervisor will work with all farmers to ensure common varietal selection, seeding dates, transplanting dates, and cultural care. This will be accomplished through winter meetings, hands on assistance, and close inspection of all growing sites and conditions. Project personnel will develop a comprehensive business plan during the same time.

Project personnel will work closely with Kansas State University (KSU), Wheatfields Bakery, and the Community Mercantile in developing recipes, packaging and labels, and marketing strategies and techniques during the months prior to canning. KSU and the Treehouse Berry Farm will work together to develop any additional low-cost processing equipment necessary for production.

Sales will proceed using the cooperative warehouse system and direct mail. Collaborators and personnel will visit various trade shows including the Natural Foods Expo, the Kansas New Products show, and other regional food showcases to test the acceptability of the new products. Regular monthly meetings will focus on quality standards, capital acquisition, dispute resolution policies, discussion of incorporation as a legal cooperative and business plan modifications.

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County Fair Tomato Cooperative: Developing an Organic Tomato Processing Cooperative

... continued

The 1999 growing season will see an increase in the number of growers and acreage, though still with close supervision from the production supervisor. Some of the previous season's production will be sold by farmers through their existing venues, including CSA, farmers market and other methods. Additional recipe and label development will be pursued. If agreed to, incorporation as a cooperative will be completed by the end of 1999. The cooperative will implement a system of self-financing that might include dues, checkoffs or the sale of marketing rights.

The period following harvest and processing will focus on intensive marketing activities, documenting the success rate of various marketing channels, and cost-benefit analysis of those activities.

The third year will see an increase in production and marketing activities. Professional management will be selected, hopefully from within the group of participating farm families. These managers will be trained in cooperative development and general business functions throughout the final year.

The project will result in the development of new processed tomato products, the development and testing of innovative marketing channels, the development of low-cost processing equipment, the organization of a successful marketing cooperative, and increased farm and farm family income for participating growers.

Heartland Sustainable Agriculture Network

New Project, Proposal

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Funding:

SARE: \$64,000
Match: \$48,950

Duration:

August 1998 - July 2000

Objectives include: 1) The Heartland Network will organize six new and support the 10 existing farmer-to-farmer clusters serving more than 200 families. The network helps farmers and ranchers work together to learn the skills to plan, develop, and transfer sustainable farming systems into their communities, and 2) The Heartland Network will organize three learning teams providing research, extension, and education to farmers and ranchers on sustainable agriculture practices and Holistic Management. These learning teams will be partnerships of producers, researchers, entrepreneurs, and educators. These teams will develop educational workshops, field days, and printed materials to aid project outreach.

Future opportunities for farmers will come from farming in ways that are fundamentally different from the past and present. To consider change, farmers often need to break from past mental models. Often, farmers find other farmers as the best reference and support for change. They learn most by watching what new ideas are being tried on their neighbor's land. Formal and informal on-farm research and demonstrations are highly valued as sources of decision-making information. The Heartland Network will organize farmer-to-farmer clusters using a study circle approach to change paradigms and transfer management innovations into rural communities.

The Heartland Network has effectively promoted sustainable agricultural practices and markets. This project will continue this success through mini-grants awarded to clusters to explore options such as management-intensive grazing, beef pasture finishing, pasture farrowing, cover crops in crop rotations, clean water farming practices, organic farming, and market development. Field trips, farm tours, training, conferences, whole-farm planning, farm trials, mentoring, and networking will assist the adoption of sustainable farming practices by clusters. Learning teams will assist in the research, documentation and information transfer of successful agricultural innovations into rural communities.

Six new farmer clusters will be formed. The Heartland Network will extend across more of the state of Kansas especially into the southeast and western parts of the state. Heartland clusters will become an even more effective tool to both demonstrate and transfer sustainable agricultural knowledge to mainstream farmers and ranchers. Clusters will more effectively collaborate with Extension and the Natural Resources Conservation Service in education.

Domestic Birds as Weed and Insect Pest Biocontrol Agents: Field Experimentation and On-Farm Evaluation

Final Report

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Funding:

SARE: \$25,200
Match: \$21,236

Duration:

September 1995 - December 1997
(Report received, June 1998)

This two-part study evaluated the agricultural and ecological potential of using free-range chickens and geese as biological control agents for insects and weeds and examined, through a set of six case studies, how free-range birds were actually used in on-farm settings. Particular attention was paid to the qualitative as well as quantitative factors that enhanced or constrained the integration of domestic birds into small-scale farming systems. The study described the ecological, social and ideological context within which bird use decisions were made on six small, Michigan farms. Interpretive data were gathered through on-farm participant observation, a value survey and farmer-framed photographs.

Study findings indicate that domestic birds, geese in particular, have potential for biological pest management. Geese show the greatest potential in diversified horticultural operations, especially when agrochemicals, such as herbicides, are not used. Production systems comprised of perennial shrubs and trees are most compatible as they provide shade for the birds and are relatively immune to feeding and trampling damage. While chickens were found to consume insects and weeds, their impact did not result in any real detectable crop protection benefits with the possible exception of their potential as predators of Japanese beetles. Achieving any measurable level of insect or weed control with free-range chickens would require much higher stocking rates than were used in this study. Study findings also suggest that the ideal use of domestic birds as biological control agents as determined through scientifically-controlled experiments differs from their real use on working farms. Farmer collaborators utilize birds and evaluate their effectiveness on the basis of localized needs and internalized values that may themselves be inconsistent and that only partially reflect rational production concerns. Differing interpretations of agricultural sustainability help to explain differences in bird use. Likewise, the age of the farming household, the organizational stability of the farming operation, local agricultural networks and community infrastructure all have a bearing on bird adoption and use.

The research took a systems approach to the study of agriculture and the environment to better understand and restore the complex plant-animal-insect relationships that exist within agroecosystems. It proceeds from the following premises: 1) Sustainable agriculture is both possible and necessary for the long-term health of the planet and all who live there. With sufficient knowledge farming systems can be managed without synthetic chemical interventions; 2) Biological stability can not be maintained in a monocultural setting and animals need to be reintegrated back into farming systems; and 3) There is a scale to well-integrated farming systems and small or family-scale operations offer insight into the diverse use of alternative agricultural practices. A full report on this project can be found at www.ent.msu.edu/birds.

Enhancing Adoption of Sustainable Agriculture Practices via Farmer-Driven Research

Annual Report

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SARE: \$100,405
Match: \$100,405

Duration:

July 1997 - July 1999

Our methodology has been to involve farmers directly in research decision-making processes and extension activities. Project goals include developing a research agenda that directly addresses farmer needs, encourages collaboration among farmers and researchers, and provides a forum where farmers can learn from other farmers. Objectives are to: 1) establish a farmer-driven design team to evaluate organic field crop systems at MSU/KBS, 2) establish a team to design low-input field crop systems for southwest Michigan, 3) evaluate the feasibility of growing organic corn without animal manure, 4) disseminate information and facilitate distance learning with electronic communications technology, and 5) host a statewide farmer-to-farmer program focusing on cover crops at MSU/KBS and three other regional alternative agriculture programs.

Farmers, researchers and Extension personnel were invited to participate in two research design teams. We have held two meetings with organic and low-input design teams, and one joint meeting. Organizers worked to make farmers feel comfortable sharing their ideas. Before the first meeting each participant received three discussion questions: 1) What are some of your biggest questions about your farming operation? 2) What are some problems or questions that have arisen when you've tried to adopt a new practice? and 3) What are some ideas you've heard of from other parts of the state, country or world that you would be interested in trying? The dominant topics that emerged in both the low-input and organic team discussions were weed management from a whole-systems perspective, diversified crop rotations and a whole-systems approach to research.

A major outcome of this year's meetings has been the design of a crop rotation experiment. The KBS Cover Crops Program had a crop rotation study underway comparing a cash grain rotation with conventional levels of chemical inputs to a low-input system that included cover crops and reduced herbicide levels. With guidance from the design teams we began transition of the conventional system to low-input, and the low-input system to organic. The teams designed the farm management protocols and provided input into what should be measured. Measures of soil quality and soil biology were considered important including: wet aggregate stability, water infiltration, bulk density, particulate organic matter, soil microarthropods, earthworms, and changes in the weed community over time. We will also assess the economic viability of the rotations, including input, labor and energy costs. We will consult with specialists at MSU to design these protocols. The rotation study has been farmed this year according to farmer protocols. Soil quality sampling will take place this fall after harvest and next spring.

continued ...

Enhancing Adoption of Sustainable Agriculture Practices via Farmer-Driven Research

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In addition to the rotation study, we have two four-acre plots in transition to organic, about which we are being advised by the organic design team. We've consulted with the Organic Crop Improvement Association (OCIA) inspector for southwest Michigan to ensure compliance, to the extent possible, with OCIA standards. It remains to be seen whether we can actually certify our research plots as organic, given constraints imposed by our situation in a research facility.

We are seeing the value of providing a forum for sustainable farmers to talk with one another. One farmer has adopted a practice for reduced nitrogen fertilizer application described by another design team member, and a new collaboration has developed between two team members in which a dairy farmer's cows will graze their cover crops during the winter.

Kellogg Biological Station hosted a statewide farmer-to-farmer program on Feb. 19, 1998, entitled *Can you use cover crops? Straight talk from the farm down the road*. Four farmers spoke to an audience of farmers about their farming systems. The last part of the program was a discussion of how the farmer participants like to receive information. They stressed the importance of learning from each other and seeing new practices on farms.

We recognize a need to develop a better forum for farmers to discuss their research and information needs. It is difficult for farmers to tell scientists what research they need. A forum is needed to allow farmers to discuss their challenges while researchers listen and pull researchable questions from that discussion. Farmer networks with on-farm tours may provide the right environment. Some training for researchers in listening and questioning may be appropriate. Participating farmers have expressed a need for research that investigates whole, integrated farming systems. Developing a methodology suitable for investigating system-level questions will be a formidable challenge for researchers.

We anticipate that the design teams will move to issues beyond agronomic research questions, including urban sprawl, marketing for sustainable products, and availability of financing for sustainable and organic growers. One farmer suggested that to set research priorities it would first be necessary to develop a vision of a future sustainable farm. In the next year of this project we will explore these larger issues, seek other venues for farmers to communicate with their peers, and continue the farmer-designed rotation study.

Innovative Tart Cherry Orchard Systems: Design, Evaluation and Demonstration

New Project, Proposal

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Funding:

SARE: \$75,000
Match: \$60,256

Duration:

August 1998 - July 2000

The goal of this project is to design, evaluate and demonstrate innovative and holistic orchard systems for tart cherry production, using practices that are effective and practical, reduce pesticide risk and environmental impact, and sustain the economic viability of fruit growers and their communities. The project consists of the following three objectives: 1) Utilize a farmer-researcher-industry partnership to design solutions to cherry industry pest and production challenges within the context of holistic orchard management, sustainability and environmental stewardship; 2) Assess two alternative orchard management systems; and 3) Use orchard walks, learning circles and other interactive educational processes to examine the orchard management systems and practices, and facilitate meaningful dialogue about holistic orchard management among the Michigan fruit production and processing community.

More than 75 percent of the U.S. tart cherry crop is produced in the North Central region, with a farm gate and value-added worth about \$150 million per year. Fruit crops provide wholesome and nutritious food, contribute to the economy of many communities and are an important part of the 'fabric' of the rural Great Lakes Region. Alternatives are imperative for fruit growers to transition to more environmentally sound and sustainable systems. While progressive growers are experimenting with highly innovative alternatives, they have not been evaluated or adopted on a broad scale.

In 1994, the farmer-researcher-industry stewardship group began to investigate alternative cherry production systems on a commercial farm. The objective was to identify alternative orchard floor and nitrogen management practices that could be implemented in existing orchards. However, development of orchards that include changes in system design required the establishment of a new orchard. In 1996, the Michigan Cherry Industry and the Michigan Department of Agriculture provided 'seed money' to establish a Phase II orchard at the Northwest Michigan Horticultural Research Station, a fruit-grower developed and governed facility managed by MSU. The Phase II site is adjacent to the Phase I orchard. Alternative systems are currently under development in the Phase II site.

The orchard systems include an integrated system of Alternative Insect Management (AIM); and a Permaculture System (PER). A third system, Integrated Pest Management (IPM) which is currently used by progressive growers is included for comparison. AIM is based on fundamental changes in the orchard ecosystem, including mixed species hedgerow barriers to reduce pest immigration and enhance beneficial arthropod abundance; insect pheromone mating disruption; endophytic grasses to inhibit pest abundance; mass trapping; tree mulches and alternative groundcovers to reduce weed competition and enhance biological diversity.

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Innovative Tart Cherry Orchard Systems: Design, Evaluation and Demonstration

... continued

The PER system will be managed for multiple purposes, such as soil quality and alternative economic opportunities. It is designed to compare six sub-systems including inorganic and organic soil nutrition management, organic farming and conventional IPM. PER is based on the use of intercropping, mixed species groundcovers for insect and nutrient management, and an emphasis on soil quality through the use of alternative nutrient management. Sixteen plant species have been selected for use in PER. System and subsystem evaluations will be based on comparisons of: 1) tree growth and vigor; 2) yield and fruit quality; 3) soil quality (biotic and abiotic); 4) plant and arthropod diversity; and 5) system equity and sustainability, including economics. The farmer-researcher-industry stewardship group sets policy and provides oversight for the project. This group is known as the Northwest Lower Michigan Integrated Fruit Practices Think Tank (IFP Think Tank).

Phase II is a unique and important opportunity to enhance an existing agricultural stewardship partnership with the fruit production community, and to design and test new holistic orchard systems and management practices. It is anticipated that the project will make a substantial positive contribution towards evaluating and demonstrating alternatives to orchard owners and managers in the environmentally sensitive Great Lakes region.

Weed Control for More Sustainable Soybean Production

Final Report

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Funding:

SARE: \$87,262
ACE: \$7,262
Match: \$43,636

Duration:

September 1995 - April 1998

The overall objectives of our work were to: 1) determine the effectiveness of the bacterial biocontrol, *Pseudomonas syringae* pv. *tagetis* (PST) and competitive soybean varieties for control of Canada thistle in organic and no-till soybean production systems, and 2) to support development of new sustainable farming systems for the North Central region by initiating a broad-based cooperative research approach to develop integrated cultural and biological weed management.

Field studies were conducted in 1996 and 1997 to determine the effectiveness of the bacterial biocontrol PST and competitive soybean varieties for control of Canada thistle in both organic and no-till production systems. The competitive soybean variety Kato improved the efficacy of two cultivations for the control of Canada thistle and had numerically lower values with respect to height and seed production for Canada thistle when compared to the non-competitive variety Evans in organic soybean production. Kato reduced the total weed density and total weed dry shoot weight when compared to Evans in no-till soybean production but did not affect marked Canada thistles in no-till production.

Soybean yield was independent of soybean variety. PST reduced Canada thistle survival by percentages of 33, 69, 91, and 93 in 1996 and percentages of 11, 32, 68 and 70 in 1997 at 35, 51, 73 and 107 DAP, respectively, in organic soybean production. In no-till soybean production, PST reduced Canada thistle survival by 5 and 50 percent at 48 and 105 DAP in 1996 and by percentages of 16, 28 and 60 at 48, 69 and 105 DAP in 1997, respectively. Canada thistle plants that survived treatment with PST were shorter and less likely to produce seed than untreated controls in both organic and no-till soybean production.

Differences in the efficacy of PST for control of Canada thistle in organic and no-till production could not be explained. PST had no impact on soybean yield. Two cultivations in organic soybean production did not improve soybean yield or weed control except in Kato where extra cultivation reduced both Canada thistle height and the average number of seed heads produced per plant. The combination of Kato plus PST plus two cultivations always resulted in the lowest values for Canada thistle seed production and generally the greatest reductions in Canada thistle height suggesting that cumulative effects of multiple weed control measures in an integrated weed management program may successfully control this weed.

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Weed Control for More Sustainable Soybean Production

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In no-till soybean production, the herbicide bentazon was more effective at reducing Canada thistle survival, height and seed production than PST but did not improve soybean yield, suggesting that weed control measures in addition to post-emergent applications of imazethapyr and sethoxydim were not necessary to maintain soybean yield in this study. Lack of yield differences between weed control treatments could not be explained. A Minnesota-based biocontrol company is cooperating with the University of Minnesota to develop the PST bacterium as a commercial weed control product.

In 1996-97 we worked to initiate a broad-based cooperative research approach to develop integrated cultural and biological weed management. An important outcome of our many discussions between farmers, researchers and extensionists is that we shifted the emphasis of our work from *research* to *farmer learning*. We are currently establishing Learning Communities (LCs) composed of farmers, local extension educators, and research and extension weed scientists that will develop integrated cultural and biological weed management methods for soybean production. Each LC will work together to examine and adapt systems thinking tools, such as agroecosystem analysis, to devise an integrated weed management method. Each group will use the integrated weed management method experimentally, assess its practical value, help develop practical and convenient means for using the approach, and help refine it. A network of LCs could accelerate farmer learning about local challenges that arise in farming systems at farm, watershed and larger scales. Ultimately, LCs could have a significant and lasting impact on the way universities conduct agricultural research.

Experiential Learning Activities for an Undergraduate Minor in Sustainable Agriculture Systems

Interim Report

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Funding:

SARE: \$122,732
Match: \$60,092

Duration:

November 1996 - July 1999

The objective of this project was to develop a sustainable food systems curriculum package for both faculty advisors and student internship hosts to fully understand and facilitate experiential learning theory and for undergraduate students to be able to fully engage in the learning cycle.

A tri-state workshop was held in March 1997 to show how experiential learning provides unique opportunities to meet the needs of highly interdisciplinary areas of study such as sustainable agriculture. Participants became aware of current trends in higher education, specifically, those related to integrating hands-on experience with academic course work; developed an understanding about underlying concepts and principles of experiential learning; identified strengths and weaknesses of current internship models; and developed specific learning activities for students using the experiential learning model.

A course is being developed which introduces students to: 1) background on theory of the experiential learning cycle so that they can design more holistic instruction; 2) how to plan for more reflective-observation activities (so that learners get more value from their concrete experiences) and; 3) how to develop more active experimentation activities (so learners see for themselves how abstract concepts fit in the world of experience). The course is being designed as a folder of activities and information to be used by internship advisors to allow maximum flexibility of use for students and advisors. Through interactions with their advisor and host organization mentor, students will be required to reflect, analyze and integrate their experiences. Approaches to help guide the students through this process will be developed and made available as part of this packet.

The purpose of the field course "Agroecosystem Analysis" was to introduce students to the concepts, principles and methods of sustainable agriculture by having them experience real-life systems that highlight practices and problems of sustainable agriculture. By spending one week in the tri-state area, (Minnesota, Iowa and Nebraska), students were exposed to the diversity of farming systems and approaches to sustainable agriculture in the region. Each of the 14 students who participated was expected to assess the physical, biological, social and economic components of each system. Through an appraisal method, e.a. sondeo, students identified the strengths and weaknesses in the overall sustainability of the system. The goal of the course was to enhance students' skills in systems assessment, problem-analysis, and decision-making in the context of sustainable agriculture.

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Experiential Learning Activities for an Undergraduate Minor in Sustainable Agriculture Systems

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A regional directory has been created which lists internship opportunities in sustainable agriculture. Potential internship hosts (producers, nonprofit organization, and public agencies) have had an enthusiastic response to the directory and are eager to be involved in the project. Organization addresses and project descriptions will be updated annually, giving hosts an opportunity to refine the ways in which they present proposed internships, and giving students a realistic view of what will be required as interns. The directory will be housed in the library of the Minnesota Institute for Sustainable Agriculture (MISA) on the University of Minnesota campus and will be listed at the MISA web site.

People to People: Sustainable Agriculture Networking for Farmers and Rural Communities

Interim Report

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Funding:

SARE: \$97,000
Match: \$29,500

Duration:

September 1996 - August 1999

The People to People project is a continuation and expansion of the Sustainable Farming Association (SFA) of Central Minnesota's networking and educational programs. The SFA recognizes that networking with other agriculture organizations and agencies can have a great effect on the community discussions and solutions for and about agriculture. The SFA can be the link to strengthening these relationships.

The focus of this project is to host workshops, farm tours and group meetings, at which farmers provide the moral, practical and informational support for farmers who are trying to make changes towards a more sustainable way of farming and towards improving the quality of life for their families and their local community, both in economic and social terms. Information presented at events has included dairy, grazing, soil nutrient management, cover crops, agroforestry, integrated whole-farm systems, buckwheat, and other alternative crop production methods. A comment from a pasture walk attendee: "It is good to have opportunities to share ideas with fellow dairymen." Outcomes are based on evaluations and media coverage.

Events held include: 280 people attended seven whole-farm planning workshops; 62 attended two marketing workshops; 180 attended six field tours; 10 graziers meeting monthly for group discussions; six buckwheat marketing/growing group discussion meetings with at least 60 interested growers and currently 17 members of the Buckwheat Growers Co-op; monthly meetings of the newly formed Whole-Farm Co-op, a cheese/meat/vegetable marketing group with at least 40 interested producers; five exhibits or presentations at local and statewide events presenting information on sustainable farming; and 43 farmers attended 11 events to network with other farmers and agriculture organizations and to bring back information about grazing, marketing, and whole-farm planning to share with other farmers.

Video equipment has been purchased. Most events are taped. We are also networking with local teachers to develop video and written curriculum for students. The curriculum for high school level on agroforestry has been completed. The other two levels will be completed in 1999.

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People to People: Sustainable Agriculture Networking for Farmers and Rural Communities

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The Buckwheat Growers Association of Central Minnesota held its first annual meeting and sold 1,207 bushels of Grade #1 buckwheat from six growers. Selling cleaned, quality grain in a larger volume as a group of farmers adds value. Through group discussions, they have learned how to improve production-harvesting methods and continue to research the market possibilities. This project has especially been networking with the Minnesota Department of Agriculture-Energy and Sustainable Agriculture Program, the Agriculture Utilization Research Institute, and the Minnesota Institute for Sustainable Agriculture to complete a decision case video project on why and how a group of producers would form a co-op.

A group of dairy farmers have collected resource information on the value of processing milk from grazing cows into specialty cheese and potential buyers for this cheese. A test batch of 250,000 lbs of milk was sent to Bass Lake, Wisc., for processing into 2,500 lbs of a variety of white cheese curds. Another 9,000 lbs was sent to Eichten's in Pine City, Minn., for processing into 900 lbs of white cheese curds. Central SFA dairy, livestock, and vegetable producers have formed the Whole-Farm Co-op with 25 members, developed a business plan for the co-op, and direct market a variety of products.

Packaging, Testing and Disseminating a Set of Indicators for Ecological, Financial and Social Monitoring on Farms

Final Report

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Funding:

SARE: \$88,000
Match: \$69,000

Duration:

September 1996 - August 1998

The Monitoring team included 25 people from the disciplines of ecology, rural sociology, hydrogeology, soil science, fish and wildlife biology and agricultural economics. It combined the perspectives of farmers, agency officials, researchers, consultants and non-profit staff. The project focused three years of baseline monitoring on farms in transition to Management-Intensive Grazing (MIG). Our overriding goal was to foster on-farm observation and interaction that brought together farmers and other professionals to monitor ecosystem health and economic and social well-being of the farm family. The Team is nearing completion of two publications. One will describe the Team's recommendations for team process to conduct whole-farm research and on-farm monitoring. The second publication will present monitoring data on the impacts of MIG on the ecology of the farms included in the study. Positive impacts of the project fall into three broad categories: 1) Documentation and observation of MIG benefits to the environment; 2) Documentation and observation of MIG benefits to farm family quality-of-life; and 3) Documentation and implementation of the project team process.

Environmental benefits from adopting MIG include: 1) Increased soil structural integrity (as measured by soil aggregate stability), improved infiltration, and greatly increased surface cover for MIG when compared to row crop production suggesting greatly reduced soil erosion under MIG; 2) Improved stream physical, biological, and water quality characteristics in stream reaches adjacent to MIG pastures when compared to stream reaches along conventionally-grazed pastures; 3) Improved grassland bird habitat within grazing systems by using extended rest periods; 4) Development of simple, inexpensive monitoring methods that improve awareness and understanding of ecosystem function; and 5) Decreased veterinary costs without negative impacts to production or herd health.

Quality of life benefits from adopting MIG include: 1) Lower-stress lifestyle and personal empowerment for farmers; 2) Construction of an accepting and supportive network of sustainable agriculture/MIG practitioners that shares ideas and experiences; 3) Development of techniques that surface underlying feelings or attitudes about farm goals and quality of life; and 4) Identification that some quality of life factors, such as spirituality, cannot be adequately described or measured through survey instruments.

Team process benefits include: 1) Bridging the gap between farmers, university researchers, and agency staff; 2) Empowerment of farmers by giving equal weight to their knowledge and observations; 3) Development of a powerful model for future dialogue about our land, water and human resources; and 4) Clarification of the terms profit and profitability in relation to farm economics at large.

Farm Beginnings: An Educational Training and Support Program to Establish Young Dairy Farmers in Southeast Minnesota

Annual Report

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Funding:

SARE: \$90,000
Match: \$140,700

Duration:

October 1997 - September 1999

The major goal of the Farm Beginnings program is to help young people establish profitable and environmentally sound dairy farming operations in the ecologically fragile southeast corner of Minnesota.

The program has five objectives:

- 1) *Networking and educational efforts to support beginning farmers.* We developed a year-long workshop series to provide participants with information in the following areas: goal setting; financial management; business planning; low-cost, sustainable production techniques; and financing alternatives. The workshop series was led by a variety of regional experts and highlighted local sustainable farmers. In the fall of 1997, seven families were recruited to participate the year long educational series. The group met in a formal setting 10 times throughout the year and also attended several field days and public workshops. The participants became a close-knit group and frequently call on each other for support and advice. Written evaluations show that participants from all experience levels found the educational series to be extremely valuable.
- 2) *Educational on-farm apprenticeships for beginning farmers.* We recruited sustainable farmers who manage profitable, low-cost operations to participate as farm mentors. Mentors applied to the program and were approved by the steering committee. Matches were made based on the needs and wants of each individual. Apprentices completed a learning goals checklist. Because all of the participants maintained full-time jobs, apprenticeships were not as extensive as originally planned. Participants were able to work on one or two farms and to visit several others to learn about their day-to-day management. Most of the beginning farmers have developed on-going mentoring relationships with experienced local sustainable farmers, including members of the steering committee.
- 3) *Retiring farmer education.* We developed an educational series that includes sustainable farm tours, legal, financial and retirement planning information, and social/educational events for retiring and new farmers. The retiring farmer instructional series had a slower start than anticipated. In addition, we have learned that it's necessary to go beyond working with farmers who are ready to retire in the near future, to reaching farmers who are just beginning to think about retiring. We are adjusting our focus and recruitment techniques and plan to hold retirement, estate, and land transfer planning sessions with middle-aged as well as older farmers. Two such sessions were held this year and were well-attended.

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Farm Beginnings: An Educational Training and Support Program to Establish Young Dairy Farmers in Southeast Minnesota

... continued

4) *Developing incubation sites.* We have re-focused our plans to develop incubation farms. After exploration, the steering committee agreed that developing permanent incubation farms would involve high costs and risks. Additionally, developing one or two of these farms would help only a small number of people to begin dairy farming. Through several meetings and much dialogue with interested groups, the committee has developed an alternative that will assist far more beginners to start in sustainable dairying at less cost and lower risk. We would like to develop on-farm "equity building partnerships" which will financially benefit both the beginning and established farmer, however we need more money to do so.

5) *Secure program support.* The program steering committee, staff and participants promoted the Farm Beginnings program and its importance to rural communities to a variety of audiences. Four new people joined the program steering committee in 1998. A relationship with Heifer Project International (HPI) was established. With HPI's assistance we will be able to form a community-lead initiative that allows beginning farmers to borrow initial start-up livestock.

Helping people begin to farm is a slow and challenging process. Providing beginners with education, resources, and networks helps them succeed. A new generation of farmers is vital to the survival of family farming and rural communities.

A Sustainable Approach to Controlling Mite Pests of Honey Bees

Annual Report

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SARE: \$78,750
Match: \$42,636

Duration:

July 1997 - July 1999

The number one priority of the beekeeping industry in the U.S. is to control the parasitic mite, *Varroa jacobsoni*. Since its introduction into the U.S. in 1987, *Varroa* has destroyed virtually all of the feral honey bee colonies and a high percentage of the commercial colonies, negatively impacting fruit and vegetable pollination and threatening the vitality of the beekeeping industry nationwide. *Varroa* mites can be effectively controlled with the registered pesticide fluvalinate (Apistan), but routine use of this pesticide within bee colonies has the potential of contaminating honey and beeswax. Recently, the mites have developed resistance to this pesticide in various regions throughout the U.S.

The most sustainable, long-term solution to control the mites is to breed honey bees that demonstrate natural mechanisms of defense against the mite. Such a breeding program was initiated at the University of Minnesota and has generated very promising results. Colonies were bred for hygienic behavior, a defense against mites and diseases in which bees detect and remove mite-infested and diseased brood from the nest. A short-term solution also is being evaluated which involves the use of natural botanical oils to treat the mites. The botanical oils are relatively safe and inexpensive, and could provide an acceptable alternative to fluvalinate.

The objectives of the project are as follows: 1) Augment the existing breeding program by increasing the number and genetic diversity of honey bee colonies that display hygienic behavior; 2) Compare the mite loads and survivorship between untreated hygienic colonies from the breeding program and untreated colonies from commercial (control) stock; and 3) Continue testing alternative treatments for the *Varroa* mite. The results from the first year of study relative to each of the objectives are as follows: 1) Two new hygienic sublines (queen mothers) were tested and included into the breeding program, bringing the total number of sublines to eight. Two more sublines will be included next summer. A minimum of 10 is necessary to avoid inbreeding in a closed population honey bee breeding program; 2) A comparison was made between 50 hygienic and 50 commercial (unselected) colonies in collaboration with a commercial beekeeper in Minnesota. The results demonstrated that the hygienic colonies had significantly less disease and produced as much honey as the commercial colonies. Importantly, after one year without Apistan treatment, the hygienic colonies had significantly lower levels of *Varroa* mites across all apiaries; 3) Four different thymol-based botanical oil formulations were tested in field colonies of a commercial beekeeper in Wisconsin. The dose responses and efficacies of the formulations for control of *Varroa* were first tested at the USDA Bee Research Lab in Arizona. The field tests were conducted blindly, and the results will be tabulated this winter.

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A Sustainable Approach to Controlling Mite Pests of Honey Bees

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It is important that beekeepers be responsible for the health of their bee colonies through environmentally sound practices. Our goal is to breed bees that can resist the mites sufficiently to decrease the reliance on pesticides use within bee hives, and to transfer the breeding technology to producers so they can take ownership and responsibility for reducing pesticide use through continued breeding efforts. Any reduction in the use of expensive pesticides means increased profit for the beekeeper, and will help ensure the purity of honey and hive products, while maintaining healthy bee colonies critical for pollination of crops, gardens and wild flowers.

Information gained from this project has been presented to various audiences at 28 research and extension meetings as well as shared through peer-reviewed and popular journal articles.

Congregationally Supported Agriculture

New Project, Proposal SPECIAL INNOVATIVE MARKETING GRANT

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Funding:
SARE: \$38,900
Match: \$23,000

Duration:
August 1998 - July 2000

This farmer-directed project will develop a marketing and educational network of livestock and vegetable farmers using sustainable practices and involving consumers such as members of church or synagogue congregations. Farmers and consumers will learn from each other and a link between the religious and farm community will be developed. The Central Chapter of the Sustainable Farming Association (SFA) recently established the Whole Farm Cooperative, Inc. (WFC) to market member's products. WFC will serve as the nucleus for our sustainable producer's groups. Farmers from across the SFA memberships, as well as non-SFA farmers, will be invited to participate as the project grows.

Our project's marketing model is based upon our experience with the adult study group at Judson Baptist Church in Minneapolis. Congregations hold groups of people who are ready to ally with farmers seeking a sustainable agriculture. We will work, over two years, with eight urban and rural congregations. We will develop educational programs on sustainable agriculture to present to members of the congregations at their churches and we will create farm tours for adults and children on our farms. Congregations may have already made a decision of conscience to support sustainable agriculture. We will provide them with access and the tools to do so.

We will survey members of the congregations to determine what products they would like and their basic knowledge of agriculture. The survey will serve as an educational tool on food production, processing, and distribution for farmers and church members. We will develop a distribution network between farmers and congregations that takes into consideration the economic efficiencies required by both parties. It will also take into account the social needs of both groups. It will educate both groups on the difficulty of good food distribution. This project is not intended to be a food subscription service. We expect to satisfy the needs of families, single people, and the elderly with a non-subscription order-taking process. The importance of a concentrated number of like-minded consumers in a congregation cannot be emphasized enough. We call this congregationally supported agriculture or CSA.

The result of this project will be the creation of a marketing network between sustainable farmers and eight church congregations based on a mutual belief in the participation by all in the creation of sustainable communities and ag systems. It will be based not only on economics, but also grounded firmly in friendship and trust of the participants. The marketing network and infrastructure developed with the help of this grant will allow the WFC to grow and serve not only customers that are church members, but other like minded customers as well. This model, we believe, will be replicable.

Strengthening Links between Meat Producers, Processors and Consumers

New Project, Proposal SPECIAL INNOVATIVE MARKETING GRANT

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Al Ringer
Farmer

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Sustainable Agriculture

Funding:

SARE: \$6,000
Match: \$6,300

Duration:

August 1998 - July 2000

Project objectives are to : 1) network with producers and custom processors to determine mutual needs in the processing of direct-marketed animals; 2) develop a brochure for consumers on the processing of locally raised meats; and 3) provide consumers with semi-annual classes on preparation of local meats.

Objective 1 will be achieved by initiating dialogue with producers and processors through informal meetings, one-on-one discussion, and other means. The project coordinator will obtain producer and processor lists from agricultural service agencies and word of mouth, and the meeting will have the stated objective of learning what each other's informational (and other) needs are, with the ultimate objective of putting together an informational brochure for consumers. Collaborator Al Ringer will help facilitate the networking. Sample discussion points will cover what information processors need from consumers, what different sorts of animals processors are willing to handle, and whether they are willing to transport animals. Following these initial discussions, a more comprehensive survey will be mailed to producers and processors. One year later, after the brochure has been distributed, the coordinator will survey participants for interest in holding follow-up meeting to revise the brochure or hold further discussion. Of particular interest will be the effectiveness of the brochure in increasing direct meat sales.

To achieve Objective 2, the project coordinator will produce a brochure for meat customers, including a directory of local processors, relevant details of each operation, information that processors need from customers, and so on. The brochure will contain a mail-back panel for feedback, both on the usefulness of the brochure itself and on the product(s). The brochure will then be distributed to producers and processors and agricultural service agencies, as well as to recent immigrant groups through English as a Second Language (ESL) classes and community centers. The coordinator has made contact with ESL classes in Duluth and plans to follow up a popular fall farm tour with semi-annual farm tours for the students, at which brochures will be available. If a second producer-processor meeting, along with a consumer feedback mail-back brochure panel, indicates a need for a revision of the brochure, the coordinator will handle this.

We have begun work on Objective 3 by providing a one-evening class in cooking with locally produced meats. We anticipate that this project will result in a less opaque process for consumers wishing to purchase locally produced meats. Producers will be better equipped to help first-time (and established) customers have their processing needs met; processors will deal with better educated consumers. As well, immigrant populations will be better able to maintain their own traditions where livestock are concerned.

Perennial Legumes for Sustainable Pasture Systems

New Project, Proposal

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Funding:

SARE: \$99,800
Match: \$87,800

Duration:

August 1998 - July 2000

The use of truly perennial pasture legumes in permanent and rotational pastures in the Upper Midwest would increase the sustainability and profitability of grass/pasture-based agriculture and increase the use of pastures on the landscape. Currently, there are no perennial legumes which are productive and persistent without reseeding. Kura clover and rhizomatous birdsfoot trefoil are new legumes with exceptional persistence and good yield potential but their seedling vigor is weak and establishment is often challenging.

Our objectives are: 1) to evaluate alternative establishment strategies for kura clover and rhizomatous birdsfoot trefoil using a research/education network, and 2) to conduct a plant breeding program for development of a new kura clover variety with increased seedling vigor. Important features of his project include: Establishment and plant breeding research will be conducted on-farm in multiple environments. Establishment strategies for the new legumes have been proposed by producers. Research will have valid experimental designs and in-field replication.

The education program will consist of field days, winter meetings, and yearly team meetings held in conjunction with a regional grazing workshop. We will develop decision case studies and other publications to use as teaching tools. Our team of producers, nonprofit organizations, and university personnel from Michigan, Minnesota, and Wisconsin will work together to accomplish our objectives. The producers are affiliated with grazing groups or farming associations. Together, we have generated ideas, designed protocol, and developed this proposal. We will evaluate the outcomes.

Addressing Agricultural Practices and Water Quality Issues through Youth-Developed Decision Cases

New Project, Proposal

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Funding:

SARE: \$41,498
Match: \$41,195

Duration:

August 1998 - July 2000

The overall goal of this project is to promote sustainable, community-based solutions about local watershed problems related to agricultural practices. Youth will involve the community through decision case discussions to examine local watershed problems and generate solutions. Youth will: 1) learn about community water quality and conservation issues and the impact that agriculture and specific agricultural issues have on the Minnesota River by developing decision cases related to these issues; 2) impact real-world problems by facilitating community forums based on decision cases; and 3) seek cooperation and constructive solutions to complex water quality problems. The local community will benefit from: 1) links established between youth, community members and decision makers; 2) increased civic involvement among the broader community about water quality issues; and 3) improved understanding of the options available to farmers with regard to enhancing water quality.

Extension educators from six counties in Minnesota's South Central Extension cluster, which is in the heart of the Minnesota River Basin, will identify youth participants through school and 4-H contacts. Youth will work with teachers and Extension educators to identify and develop decision cases related to environmentally sound management practices which impact water quality. Decision cases are discussion tools which provide a platform to discuss agricultural systems and practices which impact local water quality in a meaningful, constructive manner. Training will be provided by the Program for Decision Cases, University of Minnesota for youth and county Extension educators about decision case development and discussion.

Community forums will be held using the decision cases that were developed. From the community forum discussions, solutions will be identified in which youth and community members (including producers) can take an active role in addressing watershed issues. The planning, development and implementation of the decision cases and forums will take one year to complete. In the second year, impact of the community forums on youth, community members and watershed problems will be assessed.

Changes in behavior (changes in individual behaviors to reduce water pollution, actions taken to influence community response to watershed problems), and attitude (change in intent to reduce water pollution individually, and at the community level, willingness to be involved in solutions) are among some of the expected results of this project. In addition, we expect to see active involvement in implementing one or more of the solutions generated by the decision case discussion, and change in overall knowledge of water quality problems. In measuring water quality improvement, indicators will be used which are dependent on the specific problems identified in the selected situations.

Developing Sustainable Hog Markets and Slaughtering Arrangements for Family Farmers in Missouri

Interim Report

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Funding:

SARE: \$83,762
Match: \$24,773

Duration:

September 1996 - February 1999

The two objectives of this project are to develop sustainable hog slaughtering arrangements and markets for family farmers in Missouri. To meet these objectives, the research team identified, visited with, and consulted with producers and processors in Missouri, Iowa, Minnesota, Indiana, Illinois, Kentucky, Texas, and Michigan regarding the two objectives. More specifically, factors that contributed to the successful emergence of groups of hogs farmers working cooperatively, adding value to their product, and sourcing slaughter markets were identified and analyzed.

The results of these investigations reveal that pork producers across much of the country are faced with issues similar to those for Missouri producers. We found several examples of farmers grouping together in networks to source inputs, gather information, and sell their products. Some of these networks were new generation co-ops, some were limited liability corporations, and other were more traditional co-ops. We also found common examples of large independent farmers restructuring their operations to concentrate on farrowing and contracting with their neighbors for finishing. We also found a limited number of examples of independent farmers coordinating a farrowing to marketing system that specialized in a particular product, such as Berkshire Gold, targeted for a specialty market. A common strategy to gain and maintain better access to slaughter markets was pooling several different producers' hogs in a single potload and providing such potloads on a regular basis. Some members of the Osage group are now participating in this kind of arrangement.

Research was also conducted on the feasibility of targeting niche markets such as the Hispanic, Asian, and/or range/chemical-free/organic markets. Team members traveled to Southwest Texas with the National Pork Producers Council to investigate the kinds of pork cuts sold in the Hispanic grocery. The research team then contracted with a consulting organization to investigate the possibilities of these strategies. The results of the research indicate that although the Hispanic market is growing, that their diet in the Midwest area is rapidly becoming similar to Anglo diets which decreases the "niche" character of the market. Results regarding the range/chemical-free/organic strategy reveal that the limited amount of information on the long term trend in the market makes it difficult to make decisions to change production systems to supply this market. In particular, producer concerns about health issues and acceptable treatments remained largely unanswered as the kind of data and research needed to respond to these questions is just now being conducted. Still, a small group of the Osage producers are proceeding with their plans in that direction.

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Developing Sustainable Hog Markets and Slaughtering Arrangements for Family Farmers in Missouri

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A major result of the research was the identification of the situation regarding decreasing access to slaughter facilities. The team found a rapid demise of small slaughter facilities with USDA certification combined with a trend toward processors increasingly relying on long-term contracts with large operators for predictable supplies of quality hogs. Some packers told us that there would be some plants in the near future that only accepted contracted hogs. Packers also reported that they would kill the group's hogs but could not guarantee to give them back the same hogs for possible value-added further-processing. The research team did find a medium-size packer within an acceptable distance that would kill their hogs and guarantee to return them for further processing. In response to these findings the Osage group decided to pursue the possibility of building or obtaining a small facility for further processing of a branded label. As part of this strategy the Osage group has made contacts with regional producers of barbecue sauces to investigate whether some cooperative arrangement might be worked out between the two parties. This is now the central focus of the research project.

Use of a Vegetative Filter as an Alternative Waste Management System for a Sustainable, Seasonal, Management-Intensive Grazing Dairy

Annual Report

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Funding:

SARE: \$55,755
Match: \$79,288

Duration:

July 1997 - July 1999

The overall goal of this project is to evaluate the socio-economic and environmental feasibility and sustainability of a 60-80 cow seasonal, management-intensive grazing (MIG) dairy. The specific objectives are to: 1) evaluate a vegetative (grass/soil) filter as an effective, affordable alternative waste management system; 2) collect data necessary for the Missouri Department of Natural Resources to consider vegetative filters as an acceptable alternative to conventional lagoon or total containment systems for small to medium sized MIG dairy operations; and 3) establish an educational and demonstration model farm to teach concepts and practices of MIG dairying, and show the economic and environmental benefits of an alternative waste management system. Construction of a seasonal, MIG dairy facility is nearing completion. Heifers were bred to begin calving in a 45-day window. A search for a research specialist/manager is currently underway.

The waste management system is designed to handle liquid and solid waste from the milking parlor and holding areas. Cattle on pasture deposit approximately 71 percent of the urine and manure directly on pasture; therefore, the waste system is expected to handle only 29 percent of the total waste compared to a conventional, confinement dairy. Approximately two-thirds of this 29 percent will be scraped and hauled as a solid for spreading. The remaining one-third, or about 10 percent of the total waste, plus about five gallons per cow per day of waste water will be stored in holding tanks and applied to the vegetative filter area on a weekly basis. The filter area is two acres in size, divided into four equal cells to allow for rotation of discharge within the filter area. Monitoring of the surface and ground water will be accomplished by analysis of waste samples, soil samples, piezometers both within and outside the filter area, and a collection weir at the drainage end of the filter area.

Approximately 250 dairy producers took part in a tour of the facility during the construction and establishment phase of this project as part of the Center's Annual Field Day. Also, approximately 2,000 high school students and advisors toured the facility. Other groups, including a "dairy pasture walk" attended by 35 dairy producers, a tour by eight upper class students from Southwest Missouri State University's Advanced Dairy Production class, and 12 students from a graduate seminar at University of Arkansas have visited and learned about the project and facilities.

The investigators expect to show that a vegetative filter can be successfully used as an alternative waste management system for MIG dairies. Economic data are expected to show MIG dairies to be efficient, profitable, sustainable and environmentally compatible, and capable of producing high-quality milk. If widely adopted, the results of this project could have far-reaching impact on quality of life for dairy producers and well-being of rural communities.

Feasibility of Agroforestry System Using Management-Intensive Grazing in an Eastern Black Walnut Plantation

New Project, Proposal

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Missouri Cattlemen's Association

Funding:

SARE: \$48,487
Match: \$54,709

Duration:

August 1998 - July 2000

The major objectives of this project are to demonstrate the practicality and profitability of grazing eastern black walnut plantations. University of Missouri research has indicated that cool-season forages grown under shaded conditions can have a greater nutritive value for livestock than open-grown forages. This demonstration would test that premise under actual field conditions in a working agroforestry system and determine if there are negative effects to the trees from the grazing animals. At the same time, any positive or negative effects to the grazing animals would be noted.

This demonstration also would show how landowners may be able to increase the annual income from grazing land by the addition of black walnut trees under an agroforestry system. The walnut trees, through the production of nuts, have the potential for an annual net income of up to \$250 per acre or more while the traditional grazing system is limited to a net income of \$50 per acre or less. This integrated farming system also offers the landowner the opportunity to make a long-term investment that can help assure a sustainable farming system from one generation to the next. It also is the intent of this project to develop one or more instructional guides. The guides would be used by University of Missouri Extension personnel and other agencies and organizations to inform farmers, landowners and agency personnel.

This project will be carried out on an existing privately owned eastern black walnut plantation designed for agroforestry systems. This unique site is one of the few existing grafted walnut plantations in the country planted specifically for use as a livestock agroforestry system. Trees are planted on 40-foot rows with 20 feet between trees within the row. Trees in this demonstration area have been grafted to known, high-yielding nut producing varieties for highest income potential. Alleys between the tree rows are established in brome grass. Legumes will be interseeded. Electric fencing using high tensile wire will be used to establish the exterior boundaries and the interior travel lanes. Yearling crossbred Angus steers of approximately 500 to 600 pounds will be placed on the tree-pasture system in the spring and grazed rotationally throughout the grazing season.

Overcoming the long-held belief that cattle grazing among trees are detrimental to the trees is a major objective of this study. Through rapid rotation of the cattle by using a management-intensive grazing system where animals are moved through a series of small paddocks, it is felt that grazing should be advantageous to the trees. Manure will be more evenly distributed thus reducing the need for additional chemical fertilizers. Grazing also eliminates much of the cost of annual mowing. Recent results from a preliminary trial also show increased tree growth resulting from grazing to control vegetation.

Adding Local Value with Community Partnership Strategies

New Project, Proposal SPECIAL INNOVATIVE MARKETING GRANT

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Funding:
SARE: \$37,800
Match: \$14,235

Duration:
August 1998 - July 2000

The goal of this project is to develop a local food system that supports sustainable agriculture concepts and methods and to develop a marketing campaign that supports relationships between producers, consumers, distributors and the community-at-large, so that producers are known, respected and valued for their contributions to the social, physical and economic environment of the community.

The first objective is to facilitate the development of an attractive symbol which will identify Locally- Owned Value-Added (LOVA) fresh or processed products. To fulfill this, we will: 1) coordinate focus groups that include producers, consumers, distributors, educators and social service agencies to assess barriers and opportunities of marketing LOVA; 2) present market research and enlist marketing professionals to assist in positioning decisions; and 3) create start-up strategies for contacting consumers from existing networks of focus group participants.

The second objective is to initiate consumer education campaign to promote the LOVA symbol. To do this: 1) A speakers bureau will be formed from major participants and other qualified individuals to address meetings of civic groups, faith groups, and special events devised especially for the purpose of acquainting consumers with the LOVA symbol, its meaning and purpose; 2) All public communication and media contact methods will be utilized to introduce the LOVA symbol to the general public, such as public service announcements, press releases, etc; 3) Regular public events that cause producers and consumers to meet on equal ground will be organized, such as community pot-luck suppers, which will facilitate relationship formation; and 4) A local food conference will be organized each year to present topics of interest in workshop or seminar format that encourages the ongoing relationships between LOVA producers, consumers, distributors and other community organizations.

For the third objective, we will develop relationships with distribution channels that encourages their acceptance and use of the LOVA symbol. This will be accomplished as we: 1) establish direct contact with restaurants, grocers, specialty shops, and institutional food buyers who sell to food buyers to explain LOVA symbol, its promotion campaign, and its benefit to themselves and the community; 2) supply distribution channels with LOVA symbol point-of-purchase and promotional items; and 3) develop advertising partnerships with distributors.

continued ...

Adding Local Value with Community Partnership Strategies

... continued

For the fourth objective, we will facilitate research of a Local Food Center. We will: 1) coordinate needs assessment and create asset map of community food system components; 2) survey producers, consumers, distributors, educators, and social services to determine desirable components of a comprehensive center that would likely include a shared-use kitchen incubator/ community kitchen, shared-use warehouse and distribution area, offices, and community use facilities, such as meeting rooms and a banquet hall; and 3) contact appropriate personnel to undertake design phase of project, e.g. architects, engineers, city planning, etc.

Finally, we will create networking opportunities and assist in the formation of beneficial relationships between producers by: 1) making information and assistance available to producers wishing to form a legal structure for continued cooperation as project grows and relationships develop; and 2) facilitating formation of producer-owned distribution network to function from the local food center.

To facilitate education and outreach: 1) Market research findings, consumer trends, and marketing techniques will be explored by focus groups with all community sectors present; 2) Mass marketing campaign of LOVA symbol will reach region-wide, with distributors targeted to enhance on-site consumer education; 3) The local food center study will be presented to any interested parties to encourage support region-wide; 4) Producers will be targeted to create beneficial working relationships and a producer-owned corporation to provide long-term sustainability; 5) All activities will be documented and distributed through a web site, and available as hard copy; and 6) Project leaders will develop presentations that explain the sectoral approach to local food system development and regional marketing strategies for delivery to other regions in the start-up phase of food system organization.

Increasing Rural Women's Participation in Sustainable Agriculture and Community Development

Interim Report

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Funding:

SARE: \$62,820

Match: \$84,651

Duration:

August 1998 - August 1999

Rural women are a powerful force in shaping food and farming systems, providing leadership to their farms and communities. The Nebraska IMPACT Project — a grassroots development effort of the Nebraska Sustainable Agriculture Society, the Center for Rural Affairs, and the University of Nebraska — has supported four groups of rural women addressing sustainable agriculture, community development, and quality of life issues. Women's IMPACT groups identify issues affecting their farms and communities. They then create goals, projects and plans to address those issues. Many of the women in these groups do not want to take off-farm jobs. Instead, they want to identify value-added crops, livestock, and marketing opportunities which will enable them to stay at home and earn income for their operations.

The women involved in these groups accomplished a wide range of activities in 1998, including formal and informal education on organic gardening, pastured poultry production and processing, medicinal and culinary herb production, vegetable and flower seed production, ratite production, bison production, financial management, grain marketing, management-intensive grazing, seasonal grass-based dairies, home-based businesses, stress management, use of the Internet, and cooperative marketing. Their outreach efforts reached 223 people across the state.

Some of the lessons learned through this project in 1998 include: 1) Acquiring knowledge about production and marketing practices is not enough to hold a group together or to increase women's leadership in sustainable agriculture. Women in this project have expressed that confidence-building is a critical function of their groups. Hosting farm tours, organizing workshops, exchange visits, and outreach events, interviewing for radio programs, videos, and newspaper articles, and even obtaining their own credit cards are examples of activities that have increased the women's confidence while building their leadership skills; 2) Shared leadership and responsibility is critical to hold women's groups together. Group leaders have learned that, if their group is to sustain itself for more than a year or two, leadership responsibilities like organizing farm tours and workshops have to be divided up among most of the members. Sharing leadership responsibilities also gives each group member a chance to develop her leadership skills. In 1999, members of the longest-standing IMPACT group will mentor the newer groups to help them learn to share leadership responsibilities among all group members.

In 1999, we will survey and conduct focus group interviews with the women in these groups. This research will determine whether participating in groups has increased women's capacity to participate in and lead sustainable agriculture efforts through increasing their self-confidence, building their leadership skills, and providing them with education about sustainable agriculture.

Biologically Intensive Pest Management of Greenbugs, *Schizaphis graminum* (Rondani), on Grain Sorghum

Interim Report

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Funding:

SARE: \$64,800
Match: \$24,010

Duration:

August 1998 - August 1999

Increased environmental awareness, the uncertain future of cheap insecticides, and wide spread occurrence of insecticide resistance indicates that substitution of cheap insecticides for comprehensive pest management expertise may not be an alternative in the future. Because greenbugs have numerous, naturally occurring parasitoids and predators that are highly effective under some conditions, sorghum pest management presents the unique opportunity of incorporating biological controls into existing pest management recommendations. The primary goal of this study is to develop field based management procedures that incorporate plant resistance and biological control into our sorghum management recommendations.

Specific objectives include: 1) Determine economic and biological benefits of greenbug resistant hybrids using on-farm comparisons; and 2) Evaluate and integrate predators and parasitoids, including inoculative releases of parasitoids, into management programs involving greenbug resistant versus susceptible sorghums. Procedures include small plot cage studies as well as field size plots to study the interaction of greenbugs and biological/natural control agents in resistant and susceptible sorghums. Economic and biological comparisons to insecticide-intensive management programs will be included in remaining studies.

In field size studies, fewer greenbugs and less damage occurred in 1998 compared to 1997. Although greenbug numbers were low, the results in 1998 showed similar trends as in 1997. Averaged over all fields, preliminary analyses indicates a 69 percent reduction in the number of greenbugs per plant (Sig., $P=0.05$) and a 71 percent reduction in leaf damage (Sig., $P=0.05$) in the greenbug resistant sorghum compared to susceptible sorghum. Unlike 1997, no significant difference in yield was detected among resistant and susceptible hybrids in 1998. Predator populations were higher in 1998 and contributed to keeping greenbugs under control compared to 1997. During the seedling to pre-boot sorghum development period in 1998, there were 34 percent more predators compared to 1997. During this same time period, corn leaf aphid populations were approximately five times higher in 1998 compared to 1997. The ratio of predators to greenbugs was higher in the resistant sorghum, 1:19 versus susceptible sorghum 1:49.

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Biologically Intensive Pest Management of Greenbugs, *Schizaphis graminum* (Rondani), on Grain Sorghum

... continued

Over the entire season, parasitism rates were higher in 1998 (13.5 percent) than 1997 (2.3 percent). On August 10, 1998 (approximately four weeks post parasitoid infestation), parasitism was significantly higher (51.7 percent) in fields where parasitoids were released compared to non-release field (16.4 percent). These results indicate that development of procedures to encourage early corn leaf aphid populations and inoculative release of parasitoids hold promise as greenbug management tools.

For small plot and field cage studies, in the absence of parasitoids, resistant (antibiosis) and susceptible sorghums were killed by greenbugs, and heavy damage (approximately 84 percent leaf damage) occurred in tolerant sorghum in caged studies. When parasitoids were added, greenbug damage was reduced 68 percent in antibiosis, 29 percent (40 percent if based on total damage) in the tolerant, and 28 percent in the susceptible. Yield data is being analyzed. These data indicate the advantages of combining biological control and plant resistance to reduce pest damage.

In 1998, information from the first year studies were presented at four sorghum producer meetings, the University of Nebraska South Central Research and Extension Center field day, the University of Nebraska wheat field day, the joint Kansas/Nebraska Sorghum Board symposium, two presentations at the Entomological Society of American meeting, and was a part of the discussions at the 1998 aphid research works workshop. The information will be discussed at a 1999 University of Nebraska crop protection clinic.

Farmer-Designed Research on the Use of Legumes in Sustainable Dryland Cropping Systems

Annual Report

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Funding:

SARE: \$91,000
Match: \$44,500

Duration:

July 1997 - July 1999

Involving farmers in research is crucial to addressing real needs in production agriculture and to creating broader farmer acceptance of research findings. Our first objective is to develop an innovative model of farmer collaborator participation in research by actively involving farmers in determining on-farm research objectives and experimental approach. We have formed a farmer steering committee composed of four farmer collaborators and two other farmers who have experience with legumes in dryland cropping systems. Collaborators were chosen from areas with different soil and climatic conditions within the dryland wheat-producing region.

The committee has met and recommended specific research objectives. Trials were located on three farms and one agricultural experiment station in western Nebraska in a region with a mean annual precipitation of 17 in. These locations represent a range of soil and climatic conditions in the region. The wheat-fallow system was used on 90 percent of the acres producing wheat in 1998. The farmers ensured the statistical validity of their experimental design by working with a project consultant from the Department of Biometry to develop the design. It was designed with plots in a split-block design with two replications at each of the four sites. Main treatments were legume or fallow, split-plot treatments were three nitrogen fertilization levels.

At each site, the following protocols were followed: Austrian winter peas were planted in the fall into millet stubble; fallow plots were left in stubble. Soil tests were taken at pea planting to establish baseline values for soil particulate organic matter levels; pH; available P, K, Ca, Mg, Na, Zn; and nitrate levels. Weed counts were made in the spring on all plots to determine if peas were competing with weed growth. Peas were disked into the soil when they reached the bud stage the following spring. The field had an abbreviated fallow from date of incorporation until wheat planting in September. Pea residue was measured and evaluated for level of protection from wind erosion. Starter fertilizer was applied to all wheat planted.

Analysis of variance will be performed on the data collected to determine treatment differences in soil characteristics, weed populations, and wheat yields. Regression analysis will be used to determine legume N fertilizer equivalents. We expect to see a long-term yield benefit of using a legume. All of the farmer collaborators are interested in continuing this study over a period of years. To demonstrate agronomic and economic findings to regional farmers, Extension researchers and educators, and others interested in sustainable cropping systems, our farmer collaborators served as experts at field days held on their farms and at the local dryland cropping experimental station.

Improving Sustainability of Cow/Calf Operations with Natural Forage Systems

Annual Report

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Funding:

SARE: \$81,000
Match: \$331,140

Duration:

July 1997 - July 1999

The overall objective is to improve sustainability and profitability of cow-calf systems by matching nutrient requirements of the cow with nutrient content of grazed forages to extend the grazing season. The concept is being tested by: 1) comparing total resource use (e.g., labor, equipment, fuel and feed), production output, profitability, and riskiness of a June calving system to traditional March calving; 2) developing weaning systems that improve the match between the nutrient needs for milk production and low quality fall forages of March calving systems; and 3) educating producers about the concept of matching nutritional requirements of cattle to the nutritional content of forages to extend grazing.

Cows were calved either at a traditional calving date beginning March 15 or at a nontraditional date beginning June 15. Calves from March and June calving were weaned at the same age in October or January, respectively. The primary difference in the management of cows in the two systems is that hay was fed to March calving cows from January to May, and cows calving in June graze year long. Year long grazing was possible because the June calving matches the cow's high nutrient requirements for milk production with green immature forage and matches a dry cow's nutrient requirements with dormant low quality winter forage. In contrast, March calving matches the cow's highest nutrient needs with low quality dormant forages. Weaning date is also being evaluated as a means to better match nutrient requirements for milk production with grazed forages to improve profitability of traditional March calving systems. March-born calves are weaned in mid-August (4 ½ months of age) or in mid-November (6 ½ months of age). The effects of weaning on both cow and calf production and profitability are being evaluated over four production cycles for the cow and to slaughter for steer calves.

Data are not yet available because the first full production cycle of the cow is just completing. June-calving cows were fed 30 pounds of hay/cow/year compared to 3,182 pounds of hay/cow/year for the March calving cows during the first three years of the project. Protein supplement fed to June calving cows (131 lbs/year) has been greater than that fed to March calving cows (108 lbs/year). Pregnancy rates were about 95 percent for both March and June calving cows. Weaning weight was about 35 pounds higher for March born steer calves (471 lbs) than June born steer calves (436 lbs). From preliminary financial analysis, we estimate that feed costs have been reduced by \$50/calf. If we were to consider the opportunity cost of the forage, labor savings, and cost to feed the forage, the savings would be even larger. Because of seasonal market value of steer calves, the gross returns on the summer- and spring-born steer calves sold at weaning were very similar.

continued ...

Improving Sustainability of Cow/Calf Operations with Natural Forage Systems

... continued

Over 1,500 producers were educated about the concepts of matching the nutrient needs of the cow with nutrients in the forage at producer conferences or symposia in South Dakota, Colorado, Ohio, Nevada, Nebraska and Washington. Meetings were sponsored by National and State Cattlemen's Beef Associations, Integrated Resource Management groups, and the Extension Service.

The concepts of matching nutrient needs of the cow with nutrients available in grazed forages can reduce the amount of harvested and/or purchased feeds fed and labor and equipment costs for feeding, thereby improving profitability and sustainability; however, marketing will be a key to profitability. The concept of matching the nutrient requirements of milk production with nutrients available in natural forages has application for large areas of range and pasture land.

Annual Forages for Integrated Crop and Livestock Systems

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FARMER COOPERATORS

Funding:

SARE: \$52,000
Match: \$52,000

Duration:

August 1998 - July 2000

Annual forages can be important components of sustainable crop and livestock systems in the semi-arid High Plains region. Variation in precipitation can severely limit forage production on permanent pastures and native rangelands, forcing producers to dispose of livestock or buy expensive feed to retain them. Annual forages can often sustain these systems by extending grazing periods or feed supplies for the non-grazing periods. They can contribute to operational sustainability through better adaptation to drought conditions than grain crops have. Currently, there is very little information available on annual forage species or varieties for farmers to make informed selections. With more than 70 percent of the dryland crop area in this region devoted to a wheat-fallow production system, and alternative crops limited for economic inclusion into the rotation, annual forages have the potential to play an important role in increasing crop diversity and economic stability.

The objectives of this project are to: 1) interact with farmer cooperators to evaluate the role of annual forages for whole-farm sustainability; 2) evaluate yield and nutrient determinations on selected annual forage varieties; 3) create a protein degradability database on annual forages for beef ration formulation/evaluation with the new metabolizable protein system; and 4) monitor potential concerns for annual forage production, such as pest problems, soil water status and forage nitrate levels. General methodology will involve a technical support team of research and Extension staff working with farmer cooperators to plan which forage crops and varieties to test and demonstrate. Farmer cooperators will act as an advisory group on how annual forages fit into integrated crop and livestock systems on the basis of economic and environmental impacts. Interaction between the technical team and the cooperators will result in best management practices to publish as general recommendations for growing annual forages and utilizing them. Results will be extended to producers, industry and the Natural Resources Conservation Service.

Forage samples will be collected from on-farm demonstrations and from university forage plots at appropriate times for yield estimates and quality analysis. Nutrient and nitrate contents will be compared. Ruminant protein degradability will be calculated from digestion of forage samples in nylon bags suspended in the rumen of fistulated cattle. Soil water status and any crop pest problems will be monitored by cooperating specialists for recommendations for management of these crops. Crop and forage rotations will be intensified in semi-arid areas while reducing soil erosion and the risk of crop losses due to certain pests such as grassy weeds. There will be a development of a yield and quality database on currently available annual forage varieties that farmers can use to evaluate and select annual forages for their operations. In addition, a database for protein degradability will be established for use with computerized ration formulation or evaluation by Extension and industry personnel.

Alternative Systems for Livestock in Nebraska

New Project, Proposal

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Funding:

SARE: \$98,200
Match: \$49,850

Duration:

August 1998 - July 2000

Family farmers are hearing that larger, technology-intensive production systems for beef, swine, and dairy are their best option to remain viable into the future. Entry-level and moderate-size farmers are finding those investment demands too great and are choosing to discontinue livestock production. Since livestock income is 65 percent of the total Nebraska farm income, farmers who drop livestock will either expand crop acreage or quit farming. Agriculturally dependant communities will suffer from loss of livestock enterprises or from fewer farm families. National media coverage of pollution problems from large scale livestock systems has increased public pressure to limit livestock production.

To counter these trends, we will introduce low-cost, practical systems, such as grass-based dairying, deep-bedded swine finishing systems, and hoop structures for livestock. These systems will demonstrate the economies of integration rather than conventional economies of size. Farmers/ranchers will demonstrate and document the economic, environmental, and social impacts of systems in use on their farms. This will allow moderate-size and beginning farmers to adopt higher profit, environmentally sound livestock systems, while the public recognizes options that protect the environment.

The first objective is to recruit farmers/ranchers who are using alternative beef, dairy, and swine management and production systems. These systems have been developed on farms and ranches, but are not widely known. Farmers/ranchers lack information on the economic benefits, management skills, and the practical knowledge needed to adopt these systems. We will identify farmers/ranchers using alternative systems for livestock through University Extension, NCR SARE projects, and sustainable agriculture organizations in the region. We will locate farmers in five extension regions and in each livestock category willing to host tours and present information at workshops.

The second objective is to document the economic, social, and environmental effects of alternative systems for livestock production. These systems lack the documentation farmers/ranchers need to make informed decisions on adoption. Farmers make decisions based on economics, but their decisions also have interrelated social and environmental dimensions. We will interview at least five farmers/ranchers each year to collect economic, environmental, and quality-of-life impacts of their livestock systems. We will analyze and publish the results. The case-study analyses will document impacts of these systems. The results will be shared in workshops with extension personnel, the public, and sustainable ag organizations across the nation on how these systems contribute to family farms and rural communities.

continued ...

Alternative Systems for Livestock in Nebraska

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The third objective is to inform farm/ranch operators and agriculture support personnel of the cost, operation and performance of alternative systems for livestock. Farmers/ranchers, lenders, policy makers, Extension Educators, and research specialists all lack information on alternative systems. Livestock operators choose locally proven, practical innovations, so demonstration and testimony from their peers is a preferred method of learning. We will organize and facilitate workshops and demonstrations in each of Nebraska's five Extension regions (one in year 1 and two year 2) featuring farmer/rancher panels. Farmer support groups will be organized in cluster areas of the state to support further investigation of these alternative livestock systems. We will have extensive media coverage of events, and will publish a summary case-study document. Farmers/ranchers across the state will gain information to make informed decisions on adopting viable alternative systems for livestock. Bringing these audiences together will encourage constructive dialogue and foster improved communication and understanding of these livestock options.

Maximizing Forage and Minimizing Grain Intake in Bison Fed for Meat

Annual Report

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Funding:

SARE: \$78,360
Match: \$39,180

Duration:

July 1997 - July 1999

The objectives of this project are to evaluate more sustainable methods of growing bison for meat. Specific objectives include: 1) Evaluate feed intake, gain, feed conversion, carcass traits, and meat nutrient profile of bison fed increasing amounts of forage and decreasing amounts of hay, 2) Determine economic returns for bison bulls fed according to experimental treatments, and 3) Conduct educational sessions with bison producers using cooperating producers as peer educators. We will disseminate information in several formats to bison producers. This trial is being conducted entirely on farms and ranches with producers gathering data under the protocol of the project. Nine producers are involved at this time with data from many others possible.

Bison production is an exciting new enterprise in the Northern Plains states. Bison producers are increasing their herds as rapidly as possible and new producers are growing as reproduction allows. The growth of the industry is stimulated by the demand for a lean, low cholesterol red meat throughout the United States and Europe. Significant amounts of current production are being exported.

Bison producers are adapting their production practices from beef cattle management practices, but there are enough differences to justify separate studies. Differences are primarily behavioral and physiological. Bison are a very social animals, with strong herd instincts, loyalties, and communal protective practices. As wild animals, bison tend to behave differently according to season of the year. Activity and feed intake decrease dramatically in winter. Bison digest feeds more thoroughly than beef, especially low quality forages. Current practices are to feed grains or concentrates to weaned bison bulls in a feedlot setting until ready for slaughter. This feeding period is usually longer than a year. However, bison gains are less than satisfactory when fed grain for extended periods of time. Bison adapt to confinement but seem more content in the open spaces of pasture or range. This project will evaluate increasing the amount of forage fed to bison in the form of harvested hay or grazed pastures and decreasing the amount of grain fed. The results of this study are much anticipated by bison producers throughout the Northern Plains states and Canadian Provinces.

Results are not yet available. There is no formal bison research program in the country at this time. Virtually all research on bison production is being conducted by producers in cooperation with university scientists. This project will contribute significantly to the very limited body of knowledge on bison production.

Marketing Sustainable Agriculture and/or Organic Products in Small Metro Areas

New Project, Proposal SPECIAL INNOVATIVE MARKETING GRANT

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Northern Plains Sustainable
Agriculture Society

Funding:

SARE: \$41,355

Match: \$14,235

Duration:

August 1998 - July 1999

Consumers can play key roles in the implementation of sustainable agriculture when they are able to make educated choices in the market. Provided with information on where, how and by whom ag products were produced, consumers can and do voice their preference for products that have reduced environmental impact and pesticide residue. Although markets for sustainable/organic agricultural products have been developing rapidly in large urban areas, they have proven difficult to develop in mid-size communities (population about 125,000). Our project will pioneer a model for building sustainable/organic markets that will be applicable to small metro areas in the Midwest. Our project will develop a coordinated marketing plan that expands supply/demand in three targeted segments of the market, educates consumers and food retailers on the advantages of buying locally and regionally grown sustainable/organic products, and refines producers' growing and marketing skills through forming networks of and alliances between producers.

Our first three objectives focus on building three markets: 1) memberships in community-supported farms (CSAs), 2) direct markets (roadside stands or farmers markets), and 3) retail outlets (health food stores and supermarkets). We will conduct a coordinated recruiting strategy emphasizing personal contacts within networks or groups of people with similar or related interests, and we will improve consumers' experience by fostering farmer-member communication and by training members on the cooking/storing of seasonal produce. We will build direct markets by extending the range and season of products available, improving handling/display, and advertising at direct markets. We will build retail sales by surveying consumer preferences, expanding sales of local products to health food stores, coordinating sales of local products to supermarkets, educating consumers about the environmental advantages of sustainable/organic farming, training produce managers on proper handling, and advertising availability of local sustainable/organic products. Our fourth objective will develop producers' growing and marketing skills by sharing information through a local producers' network, developing a joint marketing arrangement, and conducting farm tours. Our fifth objective is forming marketing alliances between rural and local producers. Finally, we will document the economic impact of local marketing by assessing the implications of substituting local products for products from other areas.

Our results will include developing and disseminating a marketing model that will aid other sustainable/organic producers in building markets in other small metro areas, educating consumers and food retailers about the advantages of purchasing locally-grown products, forming networks with local producers to improve their growing and marketing skills and alliances with rural producers to improve their market access, increasing income and financial stability for family farmers, and documenting the economic impacts of local marketing.

Integrating Quality of Life, Economic and Environmental Issues: Agroecosystems Analysis of Amish Farming

Final Report

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Funding:

SARE: \$40,800
Match: \$26,400

Duration:

September 1995 - March 1998

Many Amish communities are thriving in the same market economy that is driving out so many other farm families. Our goal was to learn more about the basic principles that contribute to Amish sustainability and to use these findings to stimulate discussion in the larger society. Objectives were to: 1) determine quality of life and community values for case study Amish families; 2) analyze the economic efficiency of Amish agriculture with particular emphasis on quantifying economic benefits of community; 3) develop whole-farm nutrient budgets of select Amish farms in Ohio to evaluate nutrient cycling efficiency of Amish agriculture; and 4) facilitate discussion on how what we learn from the Amish can help other farm families balance quality of life, economic and environmental goals and become more sustainable. The approach we used in this study is based on methods of agroecosystem assessment which strongly incorporate a human ecology perspective and the influence of social factors, such as values and culture of farmers and their society on the structure and function of agroecosystems. Our results are based on intensive work with three case study Amish farmers in three different Amish church communities in Holmes County, Ohio.

Two of the families were Old Order Amish and one was New Order. A four to five year rotation of hay, corn, corn silage (on two of the farms), small grains/hay was used on the 82-, 86- and 120-acre farms with seven to 27 dairy cows. Important quality of life values included: 1) integrity of families and church communities, 2) living a simple Christian life, with minimal materialism, 3) small-scale family farming, 4) shared labor with neighbors, 5) love of creation, and 6) living and working in a pastoral landscape rich in biodiversity. The Amish farms kept an average of 54 percent of their gross income as cash profit compared to 17 percent for four non-Amish dairy farms. In some years, the New Order Amish farm netted as much cash profit from 27 cows as a non-Amish dairy farm with 68 cows (not including labor for either). The Amish farms had no hired labor costs compared to 13 percent on non-Amish dairy farms. Machinery costs on Amish farms were 50 percent lower than non-Amish dairy farms. On the two Old Order Amish farms, having several income-generating enterprises from a diversity of crops and livestock was important. Shared labor was a critical factor in sustainability and an important quality of life value. In studies of nutrient cycling efficiencies, we found ratios of nutrient inputs over outputs at the whole farm level of 2.4 for nitrogen, 2.3 for phosphorus, and 0.88 for potassium. Two of the farms had corn yields in 1996 of 187 and 178 bu/ac, compared to a county average of 116 bu/ac.

Discussions about this project played a key role in the development of the OSU Agroecosystems Management Program, particularly with respect to an appreciation of quality of life values. We consider the most important lesson learned was the economic and social value of community cooperation.

Biological Control of Foliar Diseases and Fruit Rots of Tomatoes Induced by Composts Incorporated into Soil in Conventional and Organic Tomato Systems

Final Report

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Funding:

SARE: \$103,580
Matching: \$125,000

Duration:

September 1996 - August 1998

Composts have long been known to improve soil fertility and suppress plant diseases. More recently, it has been shown that components of composts improve the ability of plants to resist disease caused by root and foliar pathogens. The objectives of this study were to: 1) develop consistently high quality, disease suppressive composts inducing systemic resistance (ISR/SAR) to disease, utilizing farm and locally produced wastes, 2) develop a compost-amended potting mix consistently inducing ISR/SAR in tomato transplants, and 3) assess the ability of selected composts in comparative farming systems to reduce foliar and fruit diseases of tomato.

A radish bacterial leaf spot bioassay was developed as a rapid and efficient method for assessing the ability of composts to induce resistance. Incorporation of composted pine bark (CPB) into planting mixes reduced bacterial spot severity of tomatoes in initial greenhouse tests, but not in field trials. Batch-to-batch variation between composts in ability to induce resistance was observed, which may explain this discrepancy. Compost water extracts prepared from various sources of composts also were effective as topical sprays for bacterial spot control in greenhouse tests, but were not effective in the field.

Several biocontrol agents have been identified that when inoculated into the CPB mix, induce systemic resistance in radish and tomato to bacterial spot. Active microorganisms include *Trichoderma hamatum* 382 and several strains of *Bacillus* spp. Combinations of these microorganisms have been identified that also suppress *Pythium* and *Rhizoctonia* damping-off of seedlings. Both are important diseases of transplants that are difficult to control in organic peat mixes. These novel compost-amended plug mixes have yet to be tested under field conditions.

Field trials utilizing composted yard wastes and composted cow manure (conventional processing tomato production) and composted cannery wastes (organic tomato production) were conducted at the Ohio Agricultural Research and Development Center (OARDC) and at Hirzel Farms, Luckey, Ohio, respectively. In the organic production trial, yields were increased 27 percent and 42 percent in 1997 and 1998, respectively, for plants grown in compost-amended soil. Low rates of compost (10-12 tons/ac) were as effective as high rates (20-24 tons/ac). Anthracnose was significantly less in tomato fruit in compost-amended plots than in non-amended controls in 1998, a year in which the disease was very serious. Yield and quality improvements for plants grown in compost-amended plots resulted in an economic gain of approximately \$300 per acre.

continued ...

Biological Control of Foliar Diseases and Fruit Rots of Tomatoes Induced by Composts Incorporated into Soil in Conventional and Organic Tomato Systems

... continued

In the conventional trial, composted yard wastes hastened maturity of tomatoes by at least three weeks. Bacterial spot was reduced in 1997, a year with high bacterial disease pressure, in compost-amended plots compared to non-amended control plots. The incidence of anthracnose on tomato fruit was not affected by compost amendments. However, the plant activator Actigard® reduced bacterial spot incidence in both years, and plants treated with Actigard® produced fewer fruit infected with anthracnose than control plants in 1997 but not 1998. Marketable yield in 1997 was higher in Actigard-treated plots than in the control in 1997, reflecting the reduced incidence of disease. Yield was not significantly higher in compost-amended plots compared to the control.

These results indicate that compost amendments play a valuable role in reducing disease and increasing yields in organic tomato production systems, although not in conventional systems. It is possible that organic production soils may better support a microbial community playing a role in induced resistance. Nutrients provided by composts play a greater role here also. Nonetheless, bacterial disease was reduced significantly in compost-amended plots in the conventional system, so it is likely that induced resistance is also occurring at some level in this conventional soil. Early ripening of tomatoes in compost-amended soils may provide an economic advantage for processing tomatoes and potentially for fresh market tomato production. Clearly, compost amendments should continue to be studied as a means of increasing sustainability in tomato production.

Results of the studies conducted during this project have been communicated to scientist and grower audiences through publications, oral presentations and posters. Presentations were made at: 1) the Tomato Disease Workshops in 1997 (Indianapolis, Ind.) and 1998 (East Lansing, Mich.), a meeting for pathologists, growers and other industry representatives; 2) the annual meeting of the American Phytopathological Society in 1997 (Rochester) and 1998 (Las Vegas, Nev.), 3) a four-state SARE Conference, Bryan, Ohio, February 1998; 4) the OEFFA Annual Conference (March 1998) in Wilmington, Ohio, to organic farmers; and 5) a meeting of the OSU/OARDC Organic Farming Initiative meeting, December 1998, to scientists and stakeholder organic farmers.

We plan to publish the results of this work in refereed journals during 1999. We will also develop fact sheet(s) for growers describing the main points of this research and potential applications for tomato production on their farms. This work will also be communicated to organic growers through the Organic Farming Initiative, an interdisciplinary initiative involving OSU researchers and growers that has recently been established at OSU-OARDC.

Use of Cover Crop Practices to Control Weeds in Integrated, Lower-Chemical Input Systems of Vegetable Production

Annual Report

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Funding:

SARE: \$87,823
Match: \$31,845

Duration:

July 1997 - July 1999

Objectives of this project are to: 1) evaluate and compare four different cover crop-vegetable cropping systems with a conventional vegetable cropping system for a) weed control, b) nitrogen cycling, c) soil biological activity, and d) overall economics in broccoli and peppers in a controlled experimental setting; 2) verify on-farm three different cover crop-vegetable cropping systems and one conventional vegetable cropping system for a) weed control, b) nitrogen cycling, c) soil biological activity and d) overall economics in broccoli and peppers; and 3) utilize cover crop experimental plots and on-farm verification trials as venues for field days, farm tours and workshops to promote viable cover crop management strategies that are economical and practical for the control of weeds in vegetable crops.

Four cover crop management strategies were evaluated on a mixture of hairy vetch (20 lb/ac), crimson clover (10 lb/ac), rye and barley (24 lb/ac each). This mixture, screened from previous work (Creamer, 1992), was found to be superior both in terms of weed suppression and in biomass production, along with subsequent nutrient release. They were evaluated for economic and ecological function in comparison with each other and a fifth control treatment. The five treatments can be described as: 1) clean-tilled control; 2) strip-tilled cover crop, rotated three weeks before and again immediately before transplanting; 3) cover crop killed/laid down with an undercutter bar, before planting; 4) flail mowed immediately before planting; 5) conventional vegetable cropping system using black plastic mulch for weed control. The target crop for the first year was sweet peppers. For 1999 it will be broccoli.

Each of four replications of the five treatments were evaluated for soil microbial biomass, earthworms, nematodes, nutrients (soil and leaf tissue), nitrogen cycling, and weed density, community composition, and biomass. Based on first year field experience, two farmer cooperators planted test plots of the cover crop mixture for on-farm evaluation. A third farmer will be added in 1999 to spring plant this mixture for a fall crop of broccoli. The ecological responses to the different cover crop treatments were very different between treatments. Statistical significance is still being evaluated at the time of this report. The 1998 growing season was very difficult for sweet pepper production, primarily due to a wet spring and an extended drought from early summer to fall. The cooling affect of the systems resulting in heavier mulch contrasted dramatically from the heat generated from the plastic mulch system. This led to differing soil biology dynamics, which led to differing nutrient cycling dynamics. Economic evaluation will occur late in 1999. We anticipate being able to characterize both the economic and ecological consequences of different cover crop management strategies in vegetables, including degree of weed suppression, dynamics with other crop pests, nutrient cycling capacities, and practicality.

Strengthening Farms on the Edge: Developing Rural/Urban Partnerships

**New Project, Proposal
SPECIAL INNOVATIVE
MARKETING GRANT**

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Funding:
SARE: \$29,450
Match: \$16,950

Duration:
August 1998 - July 1999

In Northeastern Ohio, as well as in other parts of the country, the biggest threat to the continued well-being of small, diversified farms is the problem of making an adequate profit. Traditionally farmers have preferred to work alone and have shunned retailing like the plague. It is no longer possible to continue in this manner. Farmers must learn to work together and they must learn to shop for the greatest dollar possible for their product. In the abstract, many farmers will recognize that there is strength to be achieved by cooperation and that, of course, retailing brings in more money than wholesaling. However, the reasons why these insights are not put to work here and now and on one farm or another go on and on and on. Whatever one may think of those reasons, two things emerge: 1) It is true that farmers do not have the time or disposition to organize each other so that they can work together on a daily basis, and 2) Neither do they have the skills or time to beat the bushes for the best retail price. Any suggestion that is going to succeed in improving things needs to accept rather than deny or fight against these two facts.

All of the farms participating in this proposal are located on the edge of the major Cleveland/Akron population area. This provides them with an unparalleled marketing opportunity, as well as making it possible for each farmer involved to hold off farm jobs. That income is important, but the price paid is in time away from the farm thus compounding the problem

Since all of the farmers who have shown an interest in this project are certified organic, crop rotation is especially important. With a number of farms working together we expect to be able to work out a rotation that would be better for each of us than anyone of us alone could work out. Another example of the benefits of farms cooperating is the operating to purchase equipment from pooled resources. One potato harvester might be used on two or three farms on one season.

An important component of this project will be the formation of a Board of Advisors. It will be made up of a representative of each of the groups of people who have an interest in the products of the farmer's coalition. To date we have an interest in participating from two different consumer's buying clubs, a local food co-op, a restaurant, and two people who have been members of two different Community-Supported Agriculture (CSA) farms.

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Strengthening Farms on the Edge: Developing Rural/Urban Partnerships

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Another barrier to a regional food system is the mindset of the average consumer. Supermarkets filled with prepared foods and produce imported from around the world have created a consumer who believes tomatoes in January in Northeast Ohio should be both available and presentable. Several of the participating farms have slide shows already prepared that could be presented to various consumer, school, church, and conservation groups etc. The focus of this consumer outreach program would be to explain about, e.g., the positive consequences of eating locally grown produce in season, the importance of supporting the local economy, the significance of developing a sustainable, regional food systems, and even the long term effects on farmland preservation and urban sprawl. A part of this outreach effort will be explicitly directed to kids in the inner city. We would like to develop a relationship so that in the years to come they are able themselves to establish a community garden CSA of their own. Even though there is such a relationship in existence its development will probably wait for further funding from a more local source.

A project coordinator is of utmost importance. At the beginning of the season this person will be responsible for pulling the farmers together for their joint seed purchases and planting schedule. The coordinator will be responsible for promotion, outreach and managing sales. In doing all this the Coordinator will need to consult with the farmers and Board of Advisors to obtain information as to what is available as well as their views on marketing and an outreach.

A newsletter editor and a graphic artist will be subcontracted for the monthly Coalition newsletter and brochure. It is possible that we have such a person in house.

To facilitate the continuation of this Coalition and its activities, each participating farmer has agreed to pay 10 percent of the coming seasons gross sales to go into an account which will be used to pay for the relevant activities after the SARE funds have stopped. We anticipate that this Coalition will evolve into a more formal cooperative. To decide on this, however, we need years in which to gain experience. This project is replicable and NEOCDF will be glad to assist other regions in developing such a project.

Biological Control of Bacterial Diseases of Vegetable Crops

New Project, Proposal

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Funding:
SARE: \$98,000
Match: \$182,417

Duration:
August 1998 - July 2000

Bacterial diseases cause significant yield and quality losses in vegetable crops in the North Central region of the United States. Most bacterial pathogens are seedborne, but seed sanitation procedures are not widely practiced. Vegetable producers routinely treat vegetables in the field with copper-containing materials to reduce disease development and spread, but copper resistance develops rapidly in bacterial populations. Addition of ethylene-bis dithiocarbamate (EBDC) fungicides to copper-containing compounds significantly improves the activity of the latter against bacterial pathogens. However, EBDC fungicides are under increased scrutiny as potential carcinogens and are under EPA review as a result of new regulations set in place by the Food Quality Protection Act.

Many vegetable crops produced in the North Central U.S. are raised from transplants produced in greenhouses on-farm or in specialized transplant production operations that vary widely in size and technical sophistication. Seedborne bacterial diseases often develop due to production practices and environmental conditions favorable to the pathogen. Bacteria can occur as epiphytic populations on seedlings without causing symptoms. However, when these populations are reduced significantly during transplant production, bacterial diseases are not likely to be significant in the field providing recommended crop rotation and sanitation practices are followed.

We have shown that bacterial diseases and populations are significantly reduced in seedlings produced in plug mixes prepared with composted pine bark as compared to those produced in traditional mixes prepared with sphagnum peat. These results are also obtained by applying compost-water extracts and the plant activator, Actigard (Novartis Corporation, Greensboro, N.C.). Specific microorganisms have been shown to induce systemic resistance, and this project incorporates testing such strains isolated in Ohio and elsewhere. We have also isolated two *Bacillus* strains that suppress bacterial and fungal foliar pathogens on transplants.

Our goal is to develop integrated management systems for greenhouse production of tomato, lettuce and pepper transplants that reduce or eliminate populations of bacterial pathogens that serve as initial inoculum sources for epidemics in the field. We will test this concept with bacterial spot of tomato and pepper caused by *Xanthomonas campestris* pv. *vesicatoria*, and bacterial leaf spot of lettuce, caused by *X. campestris* pv. *vitians*.

continued ...

Biological Control of Bacterial Diseases of Vegetable Crops

... continued

Our specific objectives are to: 1) complete the development of compost-amended biocontrol agent-fortified mixes consistently inducing systemic resistance (ISR) in tomato, pepper and lettuce seedlings; 2) develop a full-scale production system for compost extracts consistently inducing systemic resistance in tomato, pepper and lettuce; and 3) develop an integrated system that reduces these bacterial populations and diseases in these vegetable crops during transplant production and in the field.

Bacterial strains capable of inducing systemic resistance will be compared for efficacy in compost-amended pine bark plug mixes to identify the best candidates for registration for these vegetable crops. Secondly, we plan to cooperate with growers who produce compost on a year-round-basis to develop strategies for compost extract production. Finally, we will evaluate the use of compost-amended, biocontrol agent-fortified planting mixes, compost water extracts and specific antagonistic biological control agents singly and in combination as compared to standard practices to determine the most effective means of reducing bacterial populations and disease development.

We expect to develop a crop management system for production of vegetable transplants that integrates the use of compost-amended biocontrol agent-fortified planting mixes, compost water extracts and specific antagonistic biological control agents to ensure hardy transplants with a significantly reduced risk of developing bacterial diseases in the field, at a reasonable cost to the farmer. A significant component of this program will be the training of compost producers in the preparation of biologically active compost extracts.

The Effect of Spring-Seeded Annual Medic, genus *Medicago*, on Weed Management and Soil Quality in Corn Production

Final Report

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Funding:
SARE: \$73,000
Match: \$69,600

Duration:
September 1995 - August 1998

Production management systems that incorporate smother crops to control weeds and/or supply plant nutrients may reduce the transport of agrichemicals to surface and ground waters. Alternatives to agrichemicals will be adopted by producers when they effectively replace those chemicals without reducing crop yield, disrupting management practices, and diminishing farm profitability. This project investigated if annual medics, used as a living smother crop, would control weeds, not adversely effect corn productivity, supply N to corn, increase soil quality, and be similar in cost to synthetic chemical application.

Field experiments were conducted in South Dakota and Iowa using three species of annual medic (barrel medic, *Medicago trunculata*; burr medic, *Medicago polymorpha*; and snail medic, *Medicago scutellata*). The first of several experiments evaluated the effect of medic planting date and rate on corn production and weed control.

Medics were planted at two planting dates (about two weeks before average planting date for the area and at corn planting) and two broadcast planting rates (15 and 30 lb seed/acre). The crop year in 1995 was cool and wet, and medic grew aggressively except in drainage areas. The 1996 growing season was warmer and drier and medic biomass was about 70 percent less than in 1995. Medic planted early had more biomass and ground cover than medic planted at the same time as corn but all medic senesced by mid- to late-July. Medic reduced total weed biomass (predominant grass weeds were yellow and green foxtail, predominant broadleaf weed was common lambsquarters) in both 1995 and 1996. Corn yield was very poor in 1995 at both Brookings and Sioux Center sites and was reduced by medic. In 1996, the barrel medic broadcast at high rates reduced corn yield by about 30 percent compared to the weed-free control. However, when medic was banded into the interrow areas and alachlor was banded in the row, yields were similar to areas where only herbicide was applied.

In a second experiment, the effect of medic on soil quality and N cycling were evaluated. Medic increased water infiltration from about 1.5 inches per minute (bare soil) to about 6 inches per minute (medic planted at 30 pounds per acre). Nitrogen mineralization measured from mid-July to mid-August increased by about 50 percent in medic plots compared to areas without medic. However, nitrogen credit from medic the following year was minimal. Corn yield was not influenced in this study.

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The Effect of Spring Seeded Annual Medic, *genus Medicago*, on Weed Management and Soil Quality in Corn Production.

... continued

In economic analyses using enterprise budgets, results were similar (within 5 percent) when comparing the cost to produce a bushel of corn (assuming no N credit for the medic) using broadcast methods for medic alone or alachlor alone, or a band combination of medic (interrow) and alachlor (row). It is important to note that banding would reduce herbicide application by 50 percent compared to a broadcast application.

The information gained in this research indicates that annual medics may have a very important niche in achieving more sustainable, environmentally benign crop production systems. Early in the growing season, medic was competitive with corn for soil N. However, after the medic senesced, this N was subsequently mineralized and made available for plant uptake. When using medic, enough N must be present in the soil so corn does not become N deficient. In addition, using medic in conjunction with other agrichemicals, especially in sensitive areas such as acres coming from CRP, would benefit the soil water profile, reduce soil erosion, and reduce N losses in agronomic systems.

Agricultural Wetland Management

Final Report

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Funding:
SARE: \$65,000
Match: \$53,000

Duration:
October 1996 - December 1998

The majority of wetlands in the Prairie Pothole Region of South Dakota are owned and managed by farmers and ranchers. Studies have shown that farming through and/or adjacent to these Prairie Pothole wetlands has environmental and economic risks. The questions asked in this study are: 1) Will buffer strips reduce negative environmental and economic effects of farming wetland landscapes? 2) Are buffer strips socially acceptable? 3) Are buffer strips around wetlands economically feasible?

A farm site with 10 seasonal and temporary wetlands was chosen in Lake County, S.D. This site had been environmentally and economically monitored for five years. Buffer strips were established in blocks around eight of the wetlands in 1995. In 1997 and 1998, soil/water/plants were analyzed for nutrient content in the buffered and non-buffered wetlands. Surveys were used to determine farmer attitudes about wetland problems and benefits on agricultural land in South Dakota. Budgets were developed for four wetland management scenarios: all acres cropped, buffer blocks and wetlands not cropped (hay cut from buffers), 75' buffers and wetlands not cropped (buffers cut for hay), and buffer blocks and wetlands enrolled in the Wetland Reserve Program (WRP). Results of nutrient analyses show that the wetland buffer strip vegetation is effectively removing nutrients. Nutrients removed by the buffer are being utilized as hay instead of being lost from agricultural production into the wetland system.

Farmer surveys indicated that wetland problems included the inability to plant and harvest crops and the maintenance of weedy species in the field. Wetland benefits included wildlife habitat and groundwater recharge. Opinions about the capacity of wetlands to reduce flooding were divided. Although the wetlands store water which can reduce downstream flooding, they retain water so farmed fields are flooded. Economic costs and profitability were cited as the major problems. Survey comments suggested wetland policies should consider costs to farmers, not just wildlife habitat or flood control functions.

Economic comparisons of wetland management scenarios were completed. Long-term cost and return budgets for transitional no-till, conventional and organic systems were prepared for: 1) no wetland buffer strips, 2) wetland buffer strips developed by the owner, 3) 75' wetland buffers strips around wetlands, and 4) enrolling wetlands and buffer strip acreage in the WRP. Returns were greatest for the WRP scenario regardless of farming system.

Two wetland demonstration sites were developed. Information centers were constructed at each site. The farm demonstration site was utilized for a harvest festival and farm tour. Wetland educational materials selected by the SDSU class were distributed to participants.

Restoration of Economic and Ecological Sustainability in Western Rangeland: A Handbook

Final Report

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Funding:

SARE: \$62,800
Match: \$45,364

Duration:

September 1996 - September 1998

The overall purpose of our project was to compose, publish, and distribute a guidebook which will: 1) provide landowners with proven approaches to restoring productivity and sustainability to degraded rangeland, and 2) promote general use of sustainable agricultural practices by documenting their successful implementation on South Dakota rangeland. The guidebook describes restoration techniques employed on the Mortenson Ranch in Stanley County, S.D., and offers suggestions for applying these principles on other lands.

We organized the guidebook's contents to include the following topics: 1) the need for restoration, 2) the design of a sustainable cattle grazing regime, 3) planning and constructing a dam system to improve water resources, 4) promoting the growth of native vegetation, 5) economic analysis of ranch productivity before and after restoration activities, and 6) suggestions for landowners and requests for feedback.

The 25-page booklet, entitled *The Mortenson Ranch: Cattle and Trees at Home on the Range*, was completed in September 1998 with the printing of 7,000 copies. All county extension offices in South Dakota received copies. Numerous state and federal agencies within South Dakota, students at South Dakota State University, and members of the Stockgrowers' Association and Society for Range Management are among the groups receiving handbooks. It is available at no cost to any farmer or rancher upon request.

We anticipate distributing handbooks to many audiences (via presentations at conferences, classes, meetings) and look forward to receiving information from readers. Each handbook includes a tear-out postcard requesting suggestions and general feedback from those who used the guidebook.

Scott Astleford, rancher at White River, S.D., said the following about the guidebook: "I thought this was a very well put together guidebook. It really surprised me how it held my attention and I wanted to continue reading it. ... I liked the way you kept the guidebook in general terms and did not get in to deep details. ... Most ranchers and farmers would find this guidebook very interesting and educational."

Reduced Chemical Inputs in Alternative Potato Farming Systems

Interim Report

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SARE: \$68,400
Match: \$62,000

Duration:

September 1995 - March 1998

More chemical inputs are used for potato production than for any other crop in the North Central United States. Multiple applications of fungicides, insecticides and herbicides are made. Soil fumigation is a common practice. Synthetic fertilizers are used in relatively large quantities. In Wisconsin, the number of single family owned and operated dairy farms is declining. Many dairy farmers are looking for ways to diversify while becoming more efficient. The goal of this project was to assess the potential of growing potatoes with reduced chemical inputs on dairy farms as an efficient means of diversification.

Efficiency was achieved through reduced synthetic fertilizer purchases by substituting forage legume nitrogen credits for up to half the nitrogen demand of the potato crop. We demonstrated previously that alfalfa prior to potatoes was equivalent to 100 pounds of N per acre applied to the potato crop. Manure added additional N as well as adding P and K. Our research did not address the savings of manure application in quantitative terms. The cash value of the potato crop was hoped to provide a larger return per unit of manure than other crops. We examined in an on-farm trial the impact of manure on development of common scab of potato, as this has been a concern of growers. We saw no increase in scab due to manure application. Scab was a problem because of the relatively high pH of the soil following alfalfa and in one year this significantly reduced the cash value of the potato crop on one dairy farm.

Efficiency was also achieved by feeding cull potatoes to cows. Potato vines have been reported to be usable as cattle feed. They contain 18-20 percent crude protein. We tested the ability to harvest and ensile potato vines. Good quality silage was produced from a mixture of potato vines with corn silage or haliage. Potato vines are routinely killed prior to harvest with chemicals to toughen potato tuber skin. Mechanical vine removal eliminates the cost of chemical treatment and can result in about 2 tons dry weight per acre silage.

Since potato disease causing agents survive in potato vine debris we evaluated the impact of removing vines prior to harvest on disease in the following year. We demonstrated small effects of vine removal on early blight with less early blight present in plots with vines removed. We believe that this effect, while small, is significant in practical terms as the impact might accumulate over years.

We tested several prototype machines for harvesting potato vines. These included a flail chopper, corn chopper, sweet potato vine puller and a commercial potato vine puller made in Europe. The flail chopper worked and the corn chopper with further modifications is our top choice because a means of picking the potato vines up from between the potato hills is necessary.

Training and Transitioning New Farmers: A Practical Experiment in Farmer Self-Development and Institutional Re-Invention

Final Report

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Funding:

SARE: \$85,800
Match: \$147,250

Duration:

September 1995 - August 1998

The Wisconsin School for Beginning Dairy Farmers (WSBDF) aims to get more young people into dairy farming using management-intensive rotational grazing (MIRG). WSBDF is the only School of its type in the nation, and is administered by the Center for Integrated Agricultural Systems (CIAS). The career paths and training opportunities for New Zealand dairy farmers provides one model for the School. Adapting this training model to a program has been a challenge and a learning experience for the School's staff and committee, and the program is continuously evolving to meet the demands of Wisconsin's farming realities.

In 1995 CIAS staff traveled to New Zealand to study dairy farmer career development. Carefully institutionalized farmer career paths in New Zealand help young people of all backgrounds enter dairy farming. An important part of career trajectory in New Zealand is specialized; early-career training includes both classroom and on-farm work. MIRG plays an important role in helping young farmers get started there. In addition, dairy graziers and UW extension faculty approached CIAS about providing training in grass-based dairying. CIAS began operation of WSBDF in cooperation with the UW Farm and Industry Short Course. WSBDF originally required attendance at the 17-week Farm and Industry Short Course, participation at a weekly grazing seminar, and completion of an internship. The School now offers flexible attendance options and additional alternatives, such as distance education. The School also gives students a chance to graze, and offers assistance in identifying opportunities. Recruitment and training of new dairy farmers are key challenges facing Wisconsin and an area where New Zealand's example would be instructive. There are four training and recruitment objectives. Comparing the WSBDF to these objectives helps point out the fit between the New Zealand dairy training model and Wisconsin realities.

Objective 1: Identify strategies for recruiting beginning dairy farmers from non-farm as well as farm backgrounds. According to Dairy Farmer Career Paths, in New Zealand, approximately one-third of all entering dairy farmers came from a non-farm background in 1995. In Wisconsin in that year, less than five percent came from non-farm backgrounds. Attracting people from a variety of backgrounds can strengthen successful entry, energy level, and openness to new ideas in the dairy industry. WSBDF sends recruitment information to county extension faculty, farm press, high school ag teachers, vocational ag schools, and farmer grazing networks. Students come from farm and non-farm backgrounds. While the School's coordinator feels that WSBDF has something to offer people from farms, it holds special promise for those who don't come from a farm. And while most students have dairy farm experience, few have farm management experience. WSBDF students' ages (18 to 35) and extent of formal education vary widely. Both men and women attend the program.

continued ...

Training and Transitioning New Farmers: A Practical Experiment in Farmer Self-Development and Institutional Re-Invention

... continued

Students come from Wisconsin and outside the state. While recruiting diverse students has been successful, student numbers have been lower than hoped. Low student numbers may reflect that those in positions to pass WSBDf information on to potential students are not, or that the School's requirements did not meet students' needs. It is hoped that raising visibility and offering flexible attendance options will attract students.

Objective 2: Use training approaches that creatively combine the theoretical and the practical, and make effective use of farmer mentors and on-farm internships. In New Zealand, dairy farmer training programs move from classroom to on-farm learning and are management-oriented. Dairy farm "cadets," or apprentices, serves under carefully selected farmer mentors. Wisconsin's Farm and Industry Short Course classes offer theoretical and practical training in dairy farming. The weekly grazing seminar allows farmers and others with grazing expertise to co-teach all aspects of developing a grass-based dairy. Students go to pasture walks to see grazing in practice, to ask questions, and to learn about a variety of grazing approaches. They attend conferences, gaining practical knowledge and making important connections. After coursework, students can complete two to six month internships on Wisconsin grass-based dairy farms. A careful process matches students and farmer mentors. Internships begin in the spring, so interns reach seasonal or semi-seasonal dairies at the thick of the calving season. They get experience-fast-with managing grass and cattle.

Objective 3: Provide programs that help beginning farmers receive academic certification and earn income from meaningful farm jobs and apprenticeships. In the New Zealand training scheme, several levels of certification are available. National certificates in farm practice and farm business management tie directly to positions of increasing responsibility. In Wisconsin, meaningful certification is critical to those wishing to farm without family assistance or a farming background. WSBDf mentors provide letters of recommendation for interns working on their farms. A letter of recommendation is provided upon student request, and students receive a graduation certificate. Nearly 80 percent of graduates are farming, and more than half are on their own farm.

Objective 4: Build organizational capacity to oversee ongoing training and employment pathways as is done in New Zealand. In New Zealand, dairy cadets follow a structured path defined by the government, training centers, and the dairy industry. Field officers monitor and guide dairy students' progress through the New Zealand dairy career. Field officers' arrange job interviews and review farmer trainers. WSBDf helps students in ways similar to New Zealand field offices. The director speaks as a reference for students looking for a farm to rent or for a cattle loan and helps them evaluate a farm or situation. Wisconsin does not have a standard organizational structure for training and employing dairy farmers. Apprenticeship and sharemilking opportunities are scarce. WSBDf graduates can find meaningful farm employment hard to come by, particularly if they are without a family farm, an established employment situation, or enough equity to get a loan. Such students may work on an expanding conventional dairy, even if their goals to develop their own grass-based dairy.

WSBDf carries out the four objectives for dairy training with varying success, depending on how well Wisconsin's dairy realities match the New Zealand model. Dairy graziers have been eager to speak at the grazing seminar and serve as mentors. Students report that they have learned an immense amount from the internship. Student recruitment and post-graduation employment are weaker areas. The School is clearly unique in how it defines and fills niche. One of the successes of the School is that it has attracted interest from people who want to give something back to Wisconsin agriculture. Many different levels of support are available to those who wish to make a financial contribution to the School.

Impacts of Intensive Rotational Grazing on Stream Ecology and Water Quality

Final Report

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Funding:

SARE: \$83,626
Match: \$90,898

Duration:

October 1995 - December 1997
(Report received, March 1998)

The goals of this study were to determine whether intensive rotational grazing (IRG) can be used to allow farmers to harvest forage from riparian areas without compromising water quality and riparian habitats and to produce guidelines for environmentally sound management of riparian pastures.

A total of 21 farms were used as study sites during the two years of the study. All sites were located along spring-fed streams with potential for trout production. Trout streams are a source of recreational and tourism income for local communities, but are often heavily impacted by agricultural land use. Stream-side vegetation was managed either as a grassy bufferstrip, a continuously grazed pasture, a rotationally grazed pasture or a woody bufferstrips (limited data collected). We collected data in the following areas: forage production and vegetation community, fish community and aquatic habitat, grassland birds, small mammals, amphibians.

Rotational pastures produced much more forage than continuous pastures. The average amount of available forage on offer was 1,856 pounds per acre for ready-to-graze rotational pastures and 781 pounds per acre for continuous pastures. Forage quality did not differ significantly between pasture types. Grassy bufferstrips tended to have significantly different vegetation structure from rotational and continuous pastures, because they were not harvested in any way. Grassy bufferstrips developed tall, dense vegetation dominated by reed canarygrass and a few broadleaf species. Both continuous and rotational pastures had a shorter, more diverse plant communities with native and non-native wildflowers and legumes.

Streambanks with grassy bufferstrips were the most stable. Grassy bufferstrips had the least bare ground (17 percent) on the bank slope, while rotational pastures averaged 24.2 percent and woody buffer strips and continuous pastures had the most bare soil at 29.9 percent for woody buffers and 33 percent for continuous pastures. Instream habitat was as good at rotationally grazed sites as it was at grassy bufferstrips and was better than at either continuous pastures or woody bufferstrips.

continued ...

Impacts of Intensive Rotational Grazing on Stream Ecology and Water Quality

... continued

For all types of land management, fish community health was poor to fair. This is typical of this region, which has potential for quality trout fisheries, but has suffered from many years of poor land management. The condition of the watershed upstream from the site accounted for about 90 percent of the effects we saw at our study sites. However, when these upstream effects are factored out, grassy bufferstrips had the highest quality cold-water fisheries, rated fair versus poor ratings for rotational, continuous, and woody buffer sites. For aquatic insects, which are a food source for trout and an indicator of water quality, rotationally grazed sites were similar to grassy and woody bufferstrips and all three were better than continuously grazed sites.

Wildlife work was conducted on all sites except woody bufferstrips. We surveyed amphibians, birds, and small mammals and this work is ongoing. Preliminary results suggest that grassy bufferstrips and pastures provide habitat for specific species groups. Amphibians and declining species of grassland birds preferred pasture sites, while small mammals were found primarily in bufferstrips.

Our results suggest that rotational grazing can provide a reasonable compromise between continuous grazing and fencing livestock out of riparian areas. We are working now to educate landowners as well as agency policy makers and field staff on management strategies for riparian areas. Our efforts include field days, public presentations, published papers and articles, and development of a riparian grazing guidelines handbook.

Using Small Grain-Cover Crop Alternatives to Diversify Crop Rotations

Annual Report

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30 Other Producers

OTHERS:

Agronomists

County Extension Agents

Funding:

SARE: \$92,300
Match: \$120,000

Duration:

July 1997 - July 1999

The area planted to small grains in the Upper Midwest has steadily declined over the past 25 years. On dairy farms, increased yields of corn silage, the trend toward direct seeded alfalfa, alternative bedding options, and increased reliance on purchased feeds have lessened interest in small grains. For cash grain producers, the overwhelming emphasis on corn and soybeans, commodity support programs, and low small grain market prices have also reduced the importance of these grains in the rotation.

However, several recent developments could alter this trend: 1) The small grain market is changing. Cereal companies are looking for domestic production of food grade oats. The price for soft red winter wheat remains strong. Some micro breweries are showing interest in local barley production, and organic bakeries are interested in local production of hard red winter wheat. With small grains that don't meet food grade standards, local elevators are beginning to blend their own feed rations that include rye, oats and barley. An increasing number of grain merchants are willing to accept lots as small as 100,000 bushels of grain; 2) Cover crop research and on-farm experience in the Upper Midwest has resulted in reliable evidence that legumes can be seeded with or after small grains and furnish rapid ground cover, often some hay, and significant amounts of nitrogen for a subsequent corn crop. This increases the value of small grains in the rotation; and 3) Economic analysis has shown that a three year rotation with corn/soybean/small grains-cover crops has gross margin returns equal to the no-till corn/soybean rotation and higher than continuous corn.

The goal of this project is to capitalize on these new developments and reintroduce small grains and cover crops into crop rotations in the Upper Midwest. Three objectives of this project are to: 1) provide educational, technical and networking support to farmers interested in integrating small grain-cover crop combinations into their crop rotations. We will work with a network of 30 growers offering them acreage contracts to buy food quality small grains and cover crops; 2) broaden the range of market opportunities and uses for small grains in the Upper Midwest. To meet this objective we are working with local elevator operators, grain dealers and food processors who are interested in helping to develop and promote the production of high quality, food grade small grains; 3) evaluate and communicate the results and experiences of producers and buyers to a wider audience. To address this objective, the project will monitor the agronomic and economic aspects of small grain-cover crop phase and subsequent corn crop in the farmer's rotation, and prepare a detailed extension bulletin for producers at the end of two years. Summer field days and a newsletter will also help to reach other growers during the two year project. The newsletter will also target elevator operators, with information about purchasing, handling and marketing small grains.

Evaluating Pasture-Based Poultry Systems: Potential Contributions to Farm Diversification, Human Nutrition and Marketing Alternatives

Annual Report

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Funding:

SARE: \$89,348.00
Match: \$109,800.00

Duration:

July 1997 - July 1999

According to Allan Nation, the editor of *The Stockman Grass Farmer*, pastured poultry is an agricultural production model "...which is capable of producing an income from a small acreage equal or superior to that of most off farm jobs. . . (and) is capable of producing a very high quality of life. . . " (Salatin, iv). The greatest marketing tool of pastured poultry is the claim that it is a high quality product. This project is designed to study these claims. The project is a multi-disciplinary and multi-professional investigation that joins university scientists with farmers and other agri-professionals in a participatory research approach to begin evaluating important socio-economic and human nutrition dimensions associated with pastured poultry systems on small and medium diversified farms. Five farms in Wisconsin and Minnesota are being used as case studies. The project is the beginning of ongoing work that eventually can provide important scientific data for informing and setting standards for the developing pastured poultry industry in the United States.

The first and second objectives of the project is to evaluate if grass-based poultry systems have the capacity to significantly contribute to the beneficial diversification of small- and mid-size farms in terms of economic and quality of life issues. The economic analysis is focusing on profitability and capital requirements for the whole-farm system and the pastured poultry enterprise. 1998 was spent reconstructing farm economic records from 1997 to provide estimates and practice for the real analysis to begin in 1998. The quality of life analysis began in the summer of 1998. Farmers kept labor logs for a month to begin a quantitative analysis. The total hours spent on farm labor for each enterprise were calculated. Individual interviews on quality of life issues were also conducted to begin a qualitative analysis. Evaluation began on the important human nutrition claims associated with pastured-poultry. Emphasis has been placed on fat, cholesterol, texture, flavor, and microbiological analyses. Data has been collected from chickens raised in the summers of 1997 and 1998. When a full analysis is completed, we will decide which areas seem to indicate significant results and need further study. The sample size will be increased for these analyses during the summer of 1999. The third objective is to investigate marketing opportunities and challenges for pastured poultry products. Emphasis has been placed on the processing and regulatory components. 1997-98 was spent clarifying the laws surrounding on-farm slaughter and sale of poultry in Wisconsin and Minnesota and making a complete list of available processors.

Potential contributions of the project include: 1) Analysis of the viability of pastured poultry for small diversified farms, 2) Appraisal of the impacts of state and federal regulations on small-scale poultry processors, 3) Comparative evaluation of the human nutritional content of meat from differing poultry production systems, and 4) Provision of preliminary scientific data for developing standards for an emerging pastured poultry industry in the U. S.

Development of Sustainable Practices for Integrated Management of Apple Diseases

Annual Report

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Funding:

SARE: \$92,892
Match: \$62,668

Duration:

July 1997 - July 1999

Our main objective is to develop a biologically based program to control the major fungal diseases of apple fruit and foliage in the northern USA. If successful, this would break the continuing reliance on toxic fungicides used by conventional growers and provide a reliable non-pesticide, low-input, and low-cost framework for organic growers. The specific objectives of our current research are to: 1) assess the ability of the orchard floor cover crop Kura clover to break the life cycle of the apple scab pathogen; and 2) test the efficacy of environmentally benign compounds used as sprays during the growing season to control scab and other important foliar and fruit diseases such as cedar apple rust and the sooty blotch/flyspeck complex.

The apple scab pathogen is spread to new plant growth on apple trees in the spring through infection by inoculum (spores) released from overwintering apple leaves previously infected with scab. Kura clover is proposed to reduce spore dispersal by both providing a barrier to prevent the escape of spores from the clover canopy as well as promoting decomposition of the apple leaf litter. To accomplish Objective 1, two apple plots were seeded with Kura clover in the spring of 1997. In the spring of 1998, spore release was measured using spore samplers positioned above the Kura clover plots and control plots (existing ground cover). Apple scab infection was also monitored on the leaves of the orchard trees and leaves of small potted trees placed in the orchard as bioassay plants. To accomplish Objective 2, three benign experimental sprays, benzothiadiazole (BTH, an inducer of disease resistance), a methionine (amino acid) riboflavin (vitamin) mixture, and potassium bicarbonate, were applied to apple tree branches. Disease on the apple leaves and fruit was assessed throughout the season.

The Kura clover significantly reduced the spore concentration compared to the existing ground cover at one location but did not result in a decrease in apple scab infection on the leaves of the orchard trees at either location. All of the experimental sprays reduced apple scab infection on both leaves and fruit. Apart from the BTH spray, the experimental sprays also significantly reduced sooty blotch and flyspeck infection on fruit. None of the sprays reduced cedar apple rust infection on leaves or fruit. In reducing spore concentration, Kura clover as a ground cover also has the potential of reducing scab infection. A decrease in scab infection is expected when a better stand of the clover is present after a few more years. Typically Kura clover takes at least three years to become well established. Combining the clover as a ground cover with the use of the most effective of the experimental sprays should result in effective, non-toxic, and sustainable disease control.

Educating Consumers about Local, Sustainably Produced Meat

**New Project, Proposal
SPECIAL INNOVATIVE
MARKETING GRANT**

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EIGHT FARMERS

Funding:
SARE: \$23,200
Match: \$6,600

Duration:
August 1998 - July 2000

For the first objective of this project, we will conduct at least 13 meetings and create five media contacts per year to educate middle-to-upper income Madison, Wis., area consumers about the prevailing meat industry and buying locally produced meat. This proposal seeks to fund a Project Coordinator for a direct meat marketing and consumer education project in the Madison area. In 1997, a network of eight farmers formed a group, each committing to using "good land stewardship practices, humane methods of animal husbandry, and socially responsible, non-exploitative farming methods." The group's name, Healthy Meats!, refers to participating farmers' view that their meat is healthy for the land, animals, rural communities and consumers.

Healthy Meats! (HM!) is a project of the Michael Fields Agricultural Institute, in cooperation with the Center for Integrated Agricultural Systems, University of Wisconsin-Madison. It is not a brokerage (we get no fee for sales made) or a brand name, but an information-oriented marketing project that aims to educate consumers about their meat and encourage them to buy meat directly from HM! farmers. In its first year, HM! organizers did many things right, but discovered several obstacles to local direct meat marketing. While we have a clearer understanding of what is necessary to succeed, we need funding to hire the coordinator we see is necessary.

With a large CSA network and thriving farmers' markets, Madison has many consumers accustomed to buying food through alternative mechanisms. Many would like to buy meat directly from HM! farmers in order to support land stewardship, local family farmers, or humane treatment of animals, or simply because they prefer the taste of the meat. However, consumer surveys that HM! conducted this year show that these consumers won't become customers unless they meet HM! farmers, taste the meat, find out how much it costs, and are shown that ordering it is easy.

For the second objective, we will conduct at least five meetings per year to educate low-income consumers, including members of certain ethnic groups in the Madison area about buying meat from Healthy Meats! farmers. We believe that the sustainable agriculture movement should attempt to address low-income access in its marketing initiatives and to address the special obstacles to doing so. Madison's low-income community includes (but is not restricted to) a wide variety of ethnic groups - Hispanic, Hmong and other Southeast Asian, and African American communities.

continued ...

Educating Consumers about Local, Sustainably Produced Meat

... continued

Many ethnic cuisines use cuts of meat overlooked by the largely white Madison population. This market offers HM! farmers a chance to sell parts of their animals that currently go unsold. Also, many of these ethnic groups place a heavy emphasis on meat in their diet, and some have documented unmet meat preferences. Yet there are special obstacles to marketing meat to low-income groups, including ethnic groups. Constraints include limitations of freezer capacity, financial barriers, and logistics of timing delivery. This project addresses these and other constraints, in an attempt to create a model for marketing that serves both low-income consumers and sustainable farmers.

Our first year reveals that a principal determinant of consumers' direct purchase of meat from farmers is whether farmers and consumers actually meet. We will coordinate numerous meetings between HM! farmers and a wide range of potential consumers, from CSA members to food buying clubs, church, neighborhood and other groups; some meetings will include meat tastings, as appropriate. We will also focus attention on developing media coverage, and participate in certain public events. Growing public concerns about the meat industry, and particularly about efforts to site several large, confinement hog operations in southern Wisconsin mean that meat choice is already seen by many as a political issue. Our message will go beyond these issues, however, to emphasize taste and convenience. At meetings and in response to phone calls we get following media stories, we will explain to consumers how to order HM! meats by directly calling farmers listed on our brochure.

The information we will communicate is intended to clarify for consumers why HM! meat is a good choice, and to do so in a meticulously fact-based way. There is both sound and less reliable information available about the meat industry. We structure into this project a Technical Advisory Committee to help us identify pertinent and reliable information; we are confident that a factual analysis of the conventional meat industry today makes a compelling argument for the attributes that many consumers say they like in HM! meat.

This consumer education project will help local farmers, none of whom individually could make sufficient consumer contacts, to do so collectively. In doing so, we will not only provide markets to local owner-operated farms, but also will increase local support for buying meat raised using sustainable crop and livestock practices, humane methods of animal husbandry, and equitable labor practices. We expect to continue to encounter obstacles to doing so, to continue to solve those problems methodically, and in the process create a model for sound local marketing of meat raised using sustainable practices.

Producer Grant Program

The earth is given as a common stock for man to labor and live on ...
The small landowners are the most precious part of a state.

-Thomas Jefferson

Recognizing that producers play the lead role in our agricultural system, SARE has always been committed to involving farmers and ranchers in research grants. However, in 1992, NCR SARE pioneered a competitive grants program exclusively to fund producers striving for agricultural sustainability.

"There are a lot of low-cost solutions to solve many problems we face in agriculture," said Illinois farmer and producer grant recipient Joel Rissman. "Using the huge base of farmer ingenuity and know-how can help alleviate many troublesome issues."

The NCR has funded nearly 250 producer grants worth more than \$1 million since the inception of this grassroots program. NCR SARE awarded 46 Producer Grants in 1998, totaling more than \$220,000. Farmers and ranchers throughout the region are exploring profitable, environmentally sound alternatives on-farm that enrich their lives and their communities.

The Producer Grant Program section of this report features brief summaries, organized by state, of the farmer/rancher projects active in 1998. Projects generally last one year, although several no-cost time extensions have been granted. Summaries were written by Ken Schneider, NCR SARE's producer liaison, who travels thousands of miles in his pick-up truck to visit our producer project coordinators. Full Producer Grant reports on many of these projects are available from the NCR SARE office.

"Implementing a project like this requires innovation and the willingness to put some of your land 'at risk' for experimentation," said producer grant recipient Dave Birong, of Minnesota. "A person never knows what can ultimately happen, even though everything is well-planned. The advantage is that a new practice can be developed with SARE helping, thereby reducing the risk for the farmer."

WHO:

Farmers and ranchers.

WHAT:

Competitive grants to examine sustainable agriculture on-site, capped at \$5,000 for individuals. Groups of three or more producers could apply for \$10,000 in 1998 and \$15,000 in 1999.

WHEN:

Call for Proposals - FEB.;
Proposals due - MAY;
Funds available - SEPT.

WHERE:

North Central Region.

Producer Grants

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FNC 97-196

Long Term Benefits of Cover Crops and Crop Rotation

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SARE Funding:

\$4,818

Cover crops and crop rotation can play a vital role in crop production by increasing soil organic matter, disrupting weed and insect cycles, and controlling erosion.

Objectives: 1) To determine long-term effect of cover crop utilization, 2) To determine economic feasibility related to savings on fertilizers and pesticides, and 3) To determine which varieties/species of cover crops are best suited to southeastern Illinois.

Methods: The coordinator divided 12 acres into plots 60 by 100 feet, took soil samples to determine available nutrients and penetrometer readings to determine compaction and density, tested for organic matter, and seeded various cover crops, i.e., vetch, rye, buckwheat, oats, and clover for comparison.

Results: Project was extended for one year to gather additional data.

Indiana

FNC 97-191

Great Circle Farm CSA/Permaculture Demonstration Site

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SARE Funding:
\$5,000

Lengthening the marketing season with a permaculture system can benefit both producers and consumers in the North Central region.

Objectives: 1) To create a permaculture demonstration site for use as an educational tool for producers and future producers, and 2) To increase the length of the growing season and the variety of foods produced.

Methods: To lengthen the vegetable growing season, a greenhouse was constructed of straw bales and material that was donated and scavenged. The greenhouse was constructed in two workshops that provided a learning experience for participants. To add variety, a permaculture workshop was held to design a site and plant fruit trees, asparagus, raspberries, herbs and vegetables.

Results: The most obvious result concerned the building and use of the straw bale greenhouse, which turned out to be successful. Two restaurants were added to the producer's CSA, each was

provided with eight shares per week of early salad mixes, spinach and green onions as well as fall chard, kale and tomatoes. The outdoor permaculture site, when in production, will show that a significant amount of food can be produced on limited acreage.

FNC 97-195

Ornamental Bittersweet Production for Small Woodland Farms

Project Coordinator:

John Klueh
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Mt. Pleasant, IN 47520
812-843-4724

SARE Funding:
\$2,915

Ornamental speciality crops can extend the marketing season and provide additional income for producers in some of the highly erodible forested areas of the North Central region.

Objective: To develop a system to commercially produce American bittersweet.

Methods: Field preparation prior to planting consisted of plowing down a green cover crop, applying fertilizer as dictated by soil tests, subsoiling to breakup hardpan in rows, and incorporating composted sawdust. Three species of bitterroot were obtained for evaluation. Planting was completed by June 1. Establishment and survival was excellent, and trellises were in place as vines began elongation in August.

Results: Depending on variety, roughly 50 percent of the plantings exhibited 8 to 12 inches of vine growth. Although maximum production will not be realized for four to five years, some harvest should be available in 1999. The project has been extended one year for further evaluation.

FNC 97-173

Feasibility of Corn Stalk Ash as a Fertilizer Source

Project Coordinator:
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Portsmouth, IA 51565
712-744-3245

SARE Funding:
\$4,974

Utilizing ash residue from a corn stalk processing operation as a soil amendment would not only alleviate pressure on landfills, but also return nutrients and organic matter to farmlands.

Objective: To determine feasibility of utilizing ash residue from a company that processes corn stalks to extract furfural. The ash, currently being dumped in landfills, retains significant amounts of P, K and organic matter that could be recycled as fertilizer.

Methods: The coordinator planned to develop a process to transport and apply ash and determine proper application rates and yield response and conduct economic analysis.

Results: The project was extended for one year to gather additional data. However, early trials indicated a significant increase in soybean yield where ash was applied. Problems in handling ash have been solved, and second-year data should be much more conclusive.

FNC 97-175

Converting Woodlands into a Profitable Shade Plant Nursery

Project Coordinator:
Sylvia Dewitt
3512 Richland Road
Van Meter, IA 50261
515-996-9012

SARE Funding:
\$2,925

With proper management, woodlands and other marginal acres can provide aesthetic and monetary returns with innovative management practices.

Objective: To produce and market popular horticultural plants to generate significant annual revenue from unproductive woodlands.

Methods: The coordinator plans to clear scrub from one acre of woodlands, install fencing to repel deer, rabbits, etc., and plant 35 different varieties of hostas in separate plots.

Results: Clearing and planting has begun and the project has been extended for one year for further development and evaluation.

FNC 97-184

Trees for Food

Project Coordinator:

Mary Carter
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Fairfield, IA 52556
515-472-3057

SARE Funding:

\$5,000

Trees not only provide wildlife habitat, livestock protection and erosion control, but also may provide substantial income through production of fruits, nuts, and wood products.

Objective: To demonstrate and document the feasibility and profitability of growing selected varieties of fruit and nut trees in southeastern Iowa.

Methods: Three acres of fruit and nut tree seedlings were planted on highly erodible land that included uplands and lowlands. The selection of trees included chestnuts, hazelnuts, pecans, black walnuts, pawpaws and persimmons. Tree shelters and mulching were used to control browsing and weeds.

Results: Seedling survival was excellent on all varieties. Feasibility and profitability will be evaluated when trees begin bearing fruit and nuts.

FNC 97-181

Comparing Controlled Microbial Systems (CMS) Composting to Conventional Composting to Piled Feedlot Manure

Project Coordinator:
Rick Boller
317 S Poplar
Beloit, KS 67420
785-738-4612

SARE Funding:
\$5,000

Concentration of livestock and livestock waste requires disposal alternatives that are economically sound and environmentally safe.

Objective: To prove that there is a justifiable economic response of crops when applying CMS compost vs. conventional compost and piled manure.

Methods: The coordinator planned to set up side by side composting trials with frequent turning, microbial inoculation, proper C:N ratios, and daily monitoring of moisture and temperature vs. a typical procedure of turning a few times over six months. These two composts will be compared to each other and to piled manure for nutrient content, pH, weed seed viability, salts and pathogens.

Results: Adverse weather conditions delayed implementation. The project was extended one year.

FNC 97-180

Biological Control of Small Soapweed (*Yucca glauca* Nutt)

Project Coordinator:
Richard Baldwin
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Zurich, KS 67663-7030
913-737-5545

SARE Funding:
\$4,515

Chemical weed control on western range sites, although effective, is costly, time consuming, and may adversely effect some of the desirable native vegetation.

Objective: To demonstrate and confirm the effectiveness of Waygu crossbred cattle as a cost effect, low-management biocontrol of small soapweed.

Methods: A yucca-infested pasture was selected for a demonstration site to compare Waygu crossbred cattle, British cross-breeds, chemical treatment and a control site. Yucca stand counts were taken on all sites prior to grazing season on May 1, and final stand counts were taken on completion of grazing November 1.

Results: Sites where British/cross cattle grazed exhibited some grazing of flowers but all seed stalks remained and all yucca appeared healthy. Sites where Waygu/cross cattle grazed exhibited some healthy yucca; however, few seed stalks remained and many plants were grazed with leaves turning brown. The chemically treated yucca showed damage and yellowing of leaves on all plants while plants in the control plots appeared healthy.

FNC 97-188

Machinery Link Co.

Project Coordinator:
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316-532-1044

SARE Funding:
\$5,000

Sharing equipment with others enables producers to utilize new equipment without bearing the high costs by themselves.

Objective: To build up a database to link producers who are searching for farmers to partner with on specific pieces of equipment.

Methods: A website was created to make listings accessible and current, create visibility and increase membership. In addition, a conference was held to educate members and guests and exchange information, a booth was set up at a trade show in Great Bend, Kan., and presentations were made to Kansas Young Farmers and Women in Agriculture to explain and promote Machinery Link Co. (MLC).

Results: Forty-six new members have been added to MLC in 1998 and farmers from Kansas, Nebraska, Minnesota, North Dakota and Missouri have entered into contracts to buy and lease equipment in partnerships.

FNC 97-198

Tree Filter and Wetland Livestock Waste Management Plan

Project Coordinator:
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SARE Funding:
\$4,808

Livestock waste, with proper management, may enhance rather than endanger the environment.

Objective: To develop a feasible waste management plan to contain animal waste without constructing a lagoon.

Methods: The coordinator constructed an experimental system that included a concrete holding basin to retain solids, a wetland cell that consists of a grass- and cattail-lined earthen basin for initial filtering and slow release of excess run off, and a filter strip comprised of brome grass, trees and shrubs for final filtering.

Results: Although the system is a work-in-progress, many benefits are being realized. The concrete holding basin required cleaning only every 120 days, and the filter strip planted with 4,000 trees, shrubs and wildflowers provides excellent wildlife habitat in addition to removing nutrients from the livestock waste.

Kansas

FNC 97-171

Creating the Link: Cooperative Marketing of Organic (All Natural) Beef

Project Coordinator:
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Bronson, KS 66716

Group Project

SARE Funding:
\$9,854

Cooperative direct marketing can provide an avenue for family farmers to receive a substantial premium for high quality, grain-fed beef cattle.

Objectives: 1) To demonstrate how data can be collected and utilized by producers to assure product quality and consistency, and 2) To demonstrate cost effectiveness in market research.

Methods: Producer and processing sheets were used to collect data on each animal marketed through the co-op, with payment based on wholesale yield and wholesale primal price. In addition, a survey of wholesale meat managers was conducted to create an awareness of all natural beef and its quality and provide feedback to the producers. To create consumer awareness, in-store product demonstrations were conducted. With each demonstration, a drawing was held for a free beef grill pack and/or bed-and-breakfast get-away.

Results: Through data collection, producers were able to determine which cattle breeds and feeding procedures provided the most profit potential. The project also enhanced marketing skills and increased the ability for producers to work together to achieve a common goal.

FNC 97-166

Innovative Farmers Seeking Lowest Nitrogen Rates for Corn on Sandy Soils to Protect Ground Water

Project Coordinator:
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Climax, MI 49034
616-979-4248

Group Project

SARE Funding:
\$4,021

Contamination of ground water and its relationship to farming practices, in addition to increasing costs, has caused farmers to re-examine application methods and rates of nitrogen fertilizer and livestock manure.

Objective: To find the minimum nitrogen requirement for corn production on sandy loam soils by accounting for organic forms of nitrogen.

Methods: Using standard plots on four farms with identical soil tests, starter fertilizer, varieties of seed corn and sidedress rates of 50, 90, 130 and 170 lbs per acre of nitrogen, farmers used field length, replicated strips to determine optimal application rates.

Results: Excellent growing conditions and timely rains caused higher application rates to look favorable. However, producers involved are looking at long term averages with the feeling that .8 lbs of N per bushel may be optimum.

FNC 97-167

Innovative Farmers Seeking Sustainable Solutions through On-Farm Demonstrations

Project Coordinator:
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Tekonsha, MI 49092
517-542-2499

Group Project

SARE Funding:
\$4,750

In order to generate an optimum profit per acre with minimum application rates of pesticides and fertilizer, it is imperative to accurately determine crop yield.

Objective: To enable Innovative Farmers of South Central Michigan to collect harvest data with a high degree of accuracy to increase acceptance of sustainable agriculture practices.

Methods: The coordinator planned to purchase a weigh wagon, measuring wheel, moisture tester, etc., to accurately determine test plot yields and calibrate yield monitors on combines.

Results: The utilization of the weigh wagon and other equipment allowed the Innovative Farmers to add credibility to replicated test plots of fertilizer application rates on corn, soybean and silage variety trials.

Michigan

FNC 97-168

Developing Partnerships between Southern Michigan Cash Crop Farmers and Northern Michigan Livestock Farmers

Project Coordinator:
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Constantine, MI 49042
616-279-2151

Group Project

SARE Funding:
\$5,000

Cover crops not only provide erosion control while recycling nutrients but also can provide winter grazing where livestock are incorporated into farming operations.

Objectives: 1) To evaluate several cover crops for fall/winter grazing following early harvested potatoes and snap beans, 2) To determine livestock weight gains and economics of fall/winter grazing systems, and 3) To measure influence of rotational grazing on seed corn production.

Methods: Cereal rye and oats were seeded into a harvested potato field on August 10. Cereal rye, oats, and an oat/rape forage mix were seeded in separate strips in a harvested snap bean field on August 22. A five-acre snap bean field was seeded August 27, with test strips of clover, brassicas, triticale, wheat and oats. Brassicas were also seeded into standing seed corn on August 14 to 24.

Results: Cattle were turned into early seeded oats in September, moved to brassicas in January and cereal rye in late winter/early spring. The net return from grazing to Henry Miller (farmer) was \$11.60 per acre, while grazing costs to Wendell Miller (grazier) were approximately 40 cents per day for a 1000 lb heifer. Costs of trucking, management, etc. were extra. Yields on the following seed corn crop were lower on the grazed vs. ungrazed plots. The grazing trials will be continued another year to acquire additional data.

FNC 97-170

Integrated Row Tillage Project

Project Coordinator:
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Marshall, MI 49068
616-789-3684

SARE Funding:
\$3,523

Cultivation, interseeded cover crops, and split applications of nitrogen fertilizer may be desirable on soils where erosion and nitrogen leaching pose a problem.

Objectives: To utilize a no-till cultivator as the foundation unit that would: 1) Be an integral part of a farming system with multiple capabilities, such as weed control, interseeding cover-crops, and sidedressing nitrogen, 2) Maintain vegetative cover for erosion control, 3) Reduce

herbicide use, 4) Accommodate timely nitrogen application, and 5) Promote introduction of cover crops into standing corn.

Methods: The coordinator purchased a no-till Hiniker cultivator, gandy boxes, fertilizer attachments etc., for interseeding legumes, banding herbicides, and sidedressing 28 percent N while cultivating.

Results: The cultivator was effective in removing weeds between rows. Sidedressing nitrogen vs. preplant application allowed for reduced rates while maintaining yield. Legumes were established by interseeding. Evaluation of interseeded legume growth and effect will be conducted in 1999.

FNC 97-172

Swine Finishing in a Hoop Structure with Deep Bedding

Project Coordinator:
Gary Blonde
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Litchfield, MI 49252
517-549-8616

SARE Funding:
\$5,000

Initial cost, heating, ventilation and manure disposal in confinement systems make hoop structures an attractive alternative for swine production, especially for young farmers with less capital.

Objective: To utilize a hoop structure with deep bedding to show young farmers a low-investment, socially acceptable way to compete in the swine industry.

Methods: The coordinator will erect a 40- by 75-foot hoop structure to finish 180 feeder pigs at a time with 2.8 turn-overs per year and compare results with a conventional confinement system.

Results: The project was delayed by a construction bottleneck and was extended for one year to gather data.

FNC 97-179

The Custom Grazing of Replacement Dairy Heifers on Fuego Fescue and Barenburg Ryegrass under a Management-Intensive Grazing System

Project Coordinator:
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Linden, MI 48451
810-266-4299

SARE Funding:
\$3,518

Developing replacement dairy heifers in a Management-Intensive Grazing (MIG) system may prove beneficial to custom graziers and dairy operators.

Objective: To explore the feasibility of custom grazing dairy heifers and examine the productivity of certain forage varieties developed for grazing.

Michigan

Methods: Twenty-six acres were seeded in the spring of 1997 to a mix of Van der Haven Fuego Tall fescue, Barenburg Perennial Ryegrass, and Menna White Clover. The pasture was clipped several times, fenced and grazed lightly in fall 1997. In 1998, 11 bred holstein heifers and 10 angus yearling steers were grazed and weighed periodically to check performance.

Results: In a 153-day grazing season the holstein heifers registered gains of 1.91 lbs per day; the angus yearling steers gained an average of 2.24 lbs. Total grazing costs were 78 cents per day vs. estimated dry lot costs of \$1.25 per day. In addition, 67.08 tons of hay were harvested from the 26-acre pasture.

FNC 97-183

Transition from Traditional Grain/ Livestock Agriculture to On-Farm Roadside Marketing of Produce

Project Coordinator:
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Marshall, MI 49068
616-781-4905

SARE Funding:
\$5,000

Diversification and innovation can be the tools used to maintain family farms and revitalize rural communities.

Objective: To maintain the family farm by capitalizing on location and abili-

ties to transition from a traditional crop/livestock operation to an on-farm roadside produce marketing operation. Reconnect people to their food supply in the process.

Methods: Utilizing a location between a historic tourist town and a metropolitan area, the project coordinator decided to increase a small-scale sweet corn business into an expanded operation by adding a variety of produce. To increase production, an irrigation system was installed and a small building was erected to enhance sales and maintain produce quality.

Results: The irrigation system more than doubled production, integrated pest management has reduced chemical use, and produce quality has been maintained by facility improvement. Sales and income have been enhanced by hosting farm tours for school children to educate and connect them to their food source.

FNC 97-186

Farmer Networking to Direct Precision Ag Technologies Toward Sustainability

Project Coordinator:
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Coldwater, MI 49036
517-369-9501

Group Project

SARE Funding:
\$4,950

By networking, farmers can pool expertise, equipment and technology to incorporate precision ag techniques into sustainable agriculture operations.

Objective: To develop a network to broaden the base and technical competencies of farmers in precision ag and incorporate pest and crop scouting data into management decisions.

Methods: Eight producers attended a workshop on "farm works" computer software. A yield monitor calibration training session was held during wheat harvest and members of the group attended various precision ag workshops and shared with others. Producers also arranged meetings with local business people, Natural Resources Conservation Service and Extension personnel, private consultants, and implement dealers.

Results: In addition to the knowledge and expertise gained by individual growers, the Michigan Department of Agriculture recommended funding for the group to continue work in nitrogen and pesticide management.

FNC 97-187

Marketing On-Farm Composted Manure

Project Coordinator:
Joe Slater
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Holton, MI 49425
616-821-2843

Group Project

SARE Funding:
\$9,700

Composting of livestock manure, while providing an environmentally friendly way of handling livestock waste, also provides an excellent nutrient source for farm crops, lawns, gardens, golf courses, greenhouses, etc.

Objective: To create a partnership of farmers, government organizations and a local Future Farmers of American (FFA) chapter to market composted manure.

Methods: The partners formed a compost team to explore requirements for operating a management service to: ensure a consistent product, identify markets, evaluate product quality, determine environmental effect and economic viability and disseminate information and expand service for other on-farm composters.

Results: The team determined requirements to maintain product consistency and produced compost on two farms. The FFA members developed a marketing plan and marketed 150 yards of compost to local producers, landscapers, gardeners, and greenhouses. Project information was disseminated through local media, field days, and FFA activities. The project was extended one year for expansion and data collection.

Michigan

FNC 97-189

The Economics of Seed Saving on Three Biological Farms in Western Michigan

Project Coordinator:
Paul Keiser
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Marne, MI 49435
616-677-6176

Group Project

SARE Funding:
\$4,676

Seed saving is as important to biodiversity as biodiversity is to sustainable agriculture.

Objective: To identify effective techniques and costs of seed saving as an integral component of biodiversity.

Methods: The coordinator involved three farms in producing, processing, and saving seed from 15 to 25 varieties of squash, beans, corn, cucumbers, melons, sunflowers, and gourds. He also recorded variety and quantity of saved seeds, as well as storage methods, conducted germination tests, and recorded costs.

Results: More than 400 hours of work were spent, by three families, producing and processing 19 varieties of fruits and vegetables. Seeds have been exchanged and shared with others in the agriculture community for further propagation and testing. The project was extended for six months to complete goals outlined in the proposal.

FNC 97-199

Processing and Marketing Milk Produced on our Small Dairy Farm

Project Coordinator:
George Shetler
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Kalkaska, MI 49646
616-258-8216

SARE Funding:
\$5,000

Success and survival in the dairy industry need not be directly associated with increasing herd size.

Objective: To profitably process and market quality milk, produced on a family farm, directly to consumers.

Methods: The coordinator constructed a small processing plant, purchased used processing and bottling equipment, purchased a used delivery truck for door-to-door delivery, and purchased coolers and display cases for on-site sales.

Results: The project was extended to allow completion of the processing plant, which will be operational in early 1999.

FNC 97-194

Community-Based Marketing with the World Wide Web

Project Coordinator:
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Kerkhoven, MN 56252
320-847-3432

Group Project

SARE Funding:
\$9,992

Creating product awareness and connecting with consumers is vital to direct marketing of farm products. The Internet is one tool that can be utilized in the overall marketing scheme.

Objective: To form a study group of five local producers to research and establish a website to market meats, grains, fruits and vegetables. To use local media and direct mail to publicize the site and increase local demand with a kiosk in a local main street store.

Methods: Monthly study circles were set up to share information and make decisions; a computer consultant was hired to assist in with the kiosk and website; a local coffeehouse was chosen for the kiosk; and local news media and flyers were used to advertise.

Results: Exposure to the community via the kiosk has been excellent; Internet contacts have been less successful. However, with the site in existence for only a short while, the members of the group realize patience is required.

FNC 97-165

Feeding the Saints

Project Coordinator:
Tim King
RR 2 Maple Hill
Long Prairie, MN 56347
320-732-6203

Group Project

SARE Funding:
\$9,650

Innovative direct marketing can enhance farm profits and provide a fresh, wholesome product to consumers.

Objective: To establish a direct sales and distribution system between a group of central Minnesota sustainable livestock and vegetable producers and three central Minnesota university food systems.

Methods: The coordinator planned to conduct a pilot effort to supply farm produce in the '97-98 school year to several universities. He wanted to produce the quantity and quality specified and create a business structure to represent farmers and universities. Another strategy was to develop cleaning and packing requirements and educate staff, students, and faculty on the value of regional food products.

Results: Selling to institutions failed due to budget constraints and fear of buying from farmers vs. food service contractors. However, 25 founders formed the Whole Farm Co-op, working with the Minnesota Food Association to distribute food to low-income families and market to individuals in a church.

FNC 97-169

Development of Cultivation Equipment for Diversified Vegetable Production

Project Coordinator:
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Wilder Forest
14189 Ostlund Trail
Marine on St. Croix, MN 55047-9750
612-433-4463

SARE Funding:
\$3,194

With variations in soil types and diversity of crops, weed control is one of the major obstacles facing vegetable producers in sustainable agriculture.

Objective: To improve quality and efficiency of mechanical weed control in diversified vegetable systems through adaptation of existing equipment.

Methods: In collaboration with a local blacksmith, a prototype will be built using a master toolbar with a spring-tine toolbar to create a unique cultivator with a guidance system, leveling bed and crust breaking capabilities.

Results: The project was extended for one year for further development of equipment. However, early testing was promising. Utilizing a 4-inch diamond rear mount master toolbar and 2¼-inch cultivator bars with cut-away discs followed by knives and Lely spring tines, the project coordinator was able to cultivate within 1½ inches of plants leaving a 3-inch untouched row band and mulched, weed-free centers.

FNC 97-177

Cattle, Grass and Streams: Can They Work Together as a Sustainable Ecosystem

Project Coordinator:
Ralph Lentz
RR 2, Box 78
Lake City, MN 55041
651-345-2557

SARE Funding:
\$4,690

Allowing livestock access to riparian areas, if done properly, may be environmentally beneficial in some watersheds.

Objective: To demonstrate effects of proper grazing management on riparian area.

Methods: An area was entirely fenced free of livestock in 1967. In 1988 the area was divided into three sections with the upper section being grazed three days per month. The middle section is grazed heavily once a year in early summer, and the lower section is never grazed. In addition, a rock causeway was constructed to provide an erosion free crossing for the cattle.

Results: Both upper and middle sections, where grazing is allowed, have developed into prime trout habitat with the return of many native grasses and forbs, while the ungrazed lower section is heavily wooded and grass free, with broad shallow water and extreme bank erosion.

FNC 97-178

**Native Minnesota
Medicinal Production
Feasibility Study**

Project Coordinator:
Renne Soberg
Box 254
Lakeville, MN 55044
612-469-2527

SARE funding:
\$5,000

The expanding demand for herbal products has created market potential for many native and introduced species now growing in the Midwest.

Objective: To determine which plants, many regarded as weeds, could be commercially produced to help fill the growing demand of the pharmaceutical trade.

Methods: Of plants with known market potential, dandelion, wormwood, motherwort, penny royal, scullcap, valerian, catnip and licorice were started in a greenhouse and transplanted in the field on May 20. Harvesting and processing was conducted by hand and with old grain handling equipment that Renne converted to handle the specialty crops.

Results: With the diverse group of plants in the demonstration plots, the results were varied and surprising. However, catnip showed the most promise for the grower on this site for large-scale organic production.

FNC 97-182

**Increased Pasture Profits
through South African
Dorper Sheep**

Project Coordinator:
Michael Burke
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Erhard, MN 56534
218-739-4549

SARE Funding:
\$1,790

Superior growth and carcass quality can enhance profits from grasslands and grazing systems.

Objective: To determine economic feasibility of introducing South African Dorper Sheep genetics into a pasture-based farm flock.

Methods: The project coordinator planned to utilize Laproscopic Artificial Insemination to introduce Dorper genetics into a polypay flock and compare gain and carcass quality of pasture-finished Dorper cross lambs with purebred polypay lambs.

Results: Due to extremely dry conditions, lambs were fed 0.5 lb per day of grain for the last 60 days. However, Dorper cross lambs were 5 lbs heavier at slaughter, with 1 percent higher dressing pct, 0.01 inch lower backfat, larger loin eye and a higher leg score.

Minnesota

FNC 97-190

Diversifying a Small Crop Farm with Hogs, Poultry, Apples and Plums

Project Coordinator:
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St James, MN 56081
507-375-5396

SARE Funding:
\$1,536

Diversification and direct marketing complement family farms, rural communities and the overall concept of sustainable agriculture.

Objectives: 1) To diversify farm production to reduce financial and environmental risks of conventional crop farming, and 2) To create community awareness of positive benefits to soil, water, and health of man and animals by utilizing more natural methods of farming.

Methods: Four acres of cropland were planted to a grass/legume mix and fenced with hi-tensile wire. Apple and plum trees were planted on the perimeter for a living windbreak to enhance wildlife and provide an alternative income crop. The pasture was divided into two paddocks with chickens in movable cages in one paddock and sows with piglets in the other.

Results: Three flocks of chickens were produced and direct marketed at \$1.25 per lb dressed. Feeder pigs were pastured until mid-September then finished in confinement and direct marketed in mid-December with a live weight premium of about 18 cents per lb. The project provided a great learning experience for the Aspelund family and created an awareness of food production for their customers. An added benefit was an increase in wildlife associated with the permanent pasture. Plans are to increase livestock production and await production from the fruit trees.

FNC 97-174

Conversion of a Marginal Row-Crop and CRP Farm to a Seasonal Grass-Based Dairy

Project Coordinator:

Eric Bright
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Linneus, MO 64653
660-895-5035

SARE Funding:
\$5,000

Success should not always be measured in bushels, pounds or dollars. Quality of life, conservation of natural resources, and concern for the environment should also be considered.

Objective: To demonstrate the feasibility and effect that a seasonal grass-based dairy can have on a family farm by enhancing quality of life while protecting the environment.

Methods: The coordinator purchased used milking equipment to be installed in existing barn to meet Grade A specifications. In addition, he purchased 35 head of Jersey x cows, established grass/legume pastures on row-crop land, frost-seeded clover in a brome orchard pasture, installed hi-tensile perimeter fencing, and implemented a Management-Intensive Grazing (MIG) system.

Results: First year goals were all met. The milking parlor is in operation, fencing has been completed, and pasture renovation is underway. One season of milking has been completed. Reliance on off-farm inputs has been dramatically reduced, and the Brights are very optimistic about the future of their operation both financially and environmentally.

Nebraska

FNC 97-200

Kentucky Bluegrass Management and Variety Evaluation for Sustainable Seed Production in Western Nebraska

Project Coordinator:
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Alliance, NE 69301-5085
308-487-5541

SARE Funding:
\$4,250

Alternative crops may not only provide additional income, they can also serve to control erosion and break weed and insect cycles.

Objective: To evaluate a number of Kentucky Bluegrass varieties grown under the climate and soil conditions of the high plains of western Nebraska.

Methods: The coordinator installed a one tower irrigation pivot covering approximately 2.5 acres for test plots and seeded 17 varieties from seven different companies for evaluation. The varieties were planted on 10 by 160 foot plots and replicated three times. Data was collected and compiled by the University of Nebraska Panhandle Extension Center to show growth characteristics and yield.

Results: When plotted on a bar graph, varieties with the best sod forming characteristics produced the lowest yields of seed with the highest value per pound, while the cultivars with the highest yields of seed exhibited the poorest sod forming characteristics and the lowest value per pound of seed. The varieties in the middle provided very acceptable sod forming characteristics and yield with a contract price from \$1.20 to \$1.50 per pound. In addition to erosion control, an added bonus is that the residue, when properly managed, provides an excellent forage for livestock. The project introduced area producers to a water and soil conserving crop, which resulted in more than 1,000 acres contracted for 1999.

FNC 97-164

Promotion of Crop Diversification and Research of Speciality Crop Markets for Western North Dakota

Project Coordinator:
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POB 430
Stanley, ND 58784
701-755-3343

Group Project

SARE Funding:
\$9,680

Low prices and disease problems in a durum wheat/summer fallow rotation has left North Dakota producers searching for alternative crops and crop rotations.

Objectives: 1) To research and identify viable speciality crops, and 2) To establish contact with companies that process speciality crops and can ultimately provide producers with a source of seed and a marketing outlet.

Methods: The coordinator planned to hire a marketing specialist to research suitable speciality crops, establish market links, and develop a marketing plan. The plan will focus on speciality crops and sustainable farming practices to enhance profits and natural resources.

Results: The project was extended for one year to complete research and evaluate farmer interest.

FNC 97-176

Grazing Yearlings on Annual Forage Pastures

Project Coordinator:
Paul Klamm
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Watford City, ND 58854
701-842-2778

SARE Funding:
\$4,986

Low annual returns on capital investments from a wheat/fallow system compel some Northern Plains producers to seek alternatives.

Objective: To determine if annual forages for grazing or hay can exceed the net return per acre from traditional cereal crops in western North Dakota.

Methods: Approximately 870 acres were seeded to an annual forage selection of winter rye, oats, grazing barley, and sorghum/sudan. The area was fenced and cross fenced to produce a nine paddock grazing system, and 450 yearling cattle were turned out in mid-May and rotated through the system. Of the 870 acres, 125 harvested for hay, 190 grazed and hayed and the balance only grazed.

Results: Average daily gain for the yearlings in a four-month grazing season was 1.9 lbs per day on steers and 1.72 lbs per day on heifers. Overall beef production was 110 lbs per acre grazed. In addition, more than \$16,000 worth of hay was harvested. Net return was \$21 per acre compared to a net return of \$8 per acre for traditional spring wheat.

Ohio

FNC 97-197

Linking Sustainable Agriculture Production with Low-Income Consumers and Minorities

Project Coordinator:

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Oberlin Sustainable Agriculture Project

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Group Project

SARE Funding:

\$9,195

Creation of a direct marketing program to link producers and underserved consumers would not only provide access to fresh produce to the consumers but also enhance producer sales.

Objective: To identify options for increasing access to local and/or organic produce for two low-income populations in Lorain County, Ohio.

Methods: The coordinator hired a part time intern to meet with civic groups and churches in underserved communities and develop programs to attract more low-income residents to the Oberlin Sustainable Agriculture Project community-supported farm market in downtown Oberlin. He established partnership with the Oberlin Community Center to donate leftover market produce to food relief programs and began a process to grant subsidized community-supported agriculture shares and become authorized to accept food stamps at the farm market.

Results: The group completed a needs assessment survey to determine interest in supporting a farm market and year-long food co-op. They also: 1) Prepared a proposal and received funding for an \$8,000 grant from the campaign for human development, 2) Completed a report on researching food related small business development in low-income areas, 3) Operated the farm market to provide direct access to low-income consumers, 4) Completed a survey to determine producer interest in local food marketing and developed a plan to implement outreach initiative, and 5) Collected footage for a video on sustainable development in South Lorain.

FNC 97-185

Rotational Grazing in South Dakota — Dairy Cattle

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SARE Funding:
\$3,448

Grass-based dairying, utilizing a rotational grazing system, provides an alternative for family farmers to maximize income and lower costs.

Objective: To demonstrate why rotational grazing of dairy cattle is more efficient than dry-lot methods.

Methods: Existing grass pastures were renovated by frost seeding legumes. Warm season annuals were seeded for summer grazing, and fencing was installed for a rotational grazing system.

Results: Seeding and fencing was completed. Due to unforeseen circumstances only limited grazing was conducted in 1998. The project may be extended to gather additional data.

FNC 97-163

Composting for Disease Suppression

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SARE Funding:
\$4,610

Utilizing composted manure in crop production can have a positive effect on soil quality, disease suppression and yield.

Objective: To determine the importance of the composting process and composting ingredients on the effectiveness of compost in the production of winter radish and turnips, which had a history of disease occurring in storage.

Methods: Test plots were established to compare composted goat manure, composted cow manure, and commercial fertilizer. Ten tons of compost per acre, and the equivalent nutrient amount of NPK on the commercial fertilizer plots, was applied prior to seeding the crucifers.

Results: Early data revealed a strong favorable response from the compost treatments with compost trials outperforming fertilizer plots by 10 percent, which increased returns from winter radish by \$750 per acre.

FNC 97-192

Cooperative Marketing of Sheep Milk

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Group Project

SARE Funding:
\$10,000

Considering the increasing demand for sheep milk products and the fact that some 60 million pounds of sheep milk cheese are imported to the U.S. each year, a significant opportunity exists for expansion of sheep dairying.

Objective: To secure dairy plant status for the Wisconsin Sheep Cooperative, obtain autonomy through marketing milk in cooperatively owned milk handling containers and establish accounting and records.

Methods: The co-op received a dairy plant license for two receiving stations, named and bonded a trustee, purchased pails and liners for milk shipment, developed a record keeping system, and conducted a market analysis.

Results: The goals of the co-op are being realized. The project has begun to build a market for sheep milk. The number of processors increased from one to four. An American Cheese Society trade show provided additional exposure, and the co-op hopes to ship milk to two new processors in 1999.

FNC 97-193

Replacing Chemical Weed Control with Mulch in Commercial Blueberries

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SARE Funding:
\$4,980

While chemicals may provide excellent weed control in blueberry production, they contribute very little to soil organic matter, moisture holding capacity, erosion control, or soil biota.

Objective: To reduce or eliminate the use of chemical herbicides in commercial blueberry production.

Methods: The coordinator purchased and utilized a chipper to produce mulch from weed species of trees that were removed from farm woodlot. He also mulched three-fourths of an acre of blueberries (rows were mulched four feet wide and six inches deep).

Results: Early weed suppression in May and June was very good on all weeds except dandelion. Later in the season some perennial thistles and quackgrass emerged. Plant growth on mulched acres was 10 to 15 percent greater than control. Mulched rows had very little erosion vs. significant erosion in unmulched rows. Moisture retention and infiltration,

although not quantified, was increased, and soil organisms such as earthworms and fungi were much more evident in the mulched areas.

What is a Diversity Enhancement Grant?

The two projects on pages 130-131 represent North Central Region SARE funds invested in communities not previously engaged in the SARE program. The NCR SARE program is committed to involving a diverse group of institutions, organizations, and individuals in exploring sustainable agriculture. We hope to not only provide funding for quality projects led by individuals and groups, but also to learn about different cultures and peoples and how their agricultural practices and systems can enhance North Central region food and farming systems.

With these grants, we are proud to sponsor our regional Native Americans in their quest to sustain farming and ranching systems. Look for more special grants to enhance North Central region diversity in agriculture in future reports.

-Steve Waller, NCR Regional Coordinator

DE 97-01

Re-Establishing Bison on Native Lands

Project Coordinator:
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Wakpala, SD 57658

SARE Funding:
\$4,923

Re-establishing bison on native lands may enable Native Americans to regain some of the independence and pride that was lost when they were placed on reservations.

Objectives: 1) To regain control, by individuals, of trust land along the Missouri River and its tributaries that has been managed by the U.S. Army Corp of Engineers after they constructed dams and, 2) To establish bison on said lands.

Methods: The coordinator endeavored to construct permanent fencing and establish a small herd of bison to utilize grazing resources below a designated water mark. The coordinator also wanted to construct holding and handling facilities for the herd.

Results: The coordinator was able to fence and regain control of 80 acres of land from the Corp of Engineers that was part of an original allotment to his grandfather. He also constructed excellent holding and working facilities using railroad ties and guard rails. He attended range management workshops at Sitting Bull College in Fort Yates, and he will begin establishing a bison herd in 2000.

DE 97-02

Gardening and Gathering on the Rosebud Reservation

Project Coordinator:
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Mission, SD 57555

SARE Funding:
\$8,000

Re-introduction of indigenous foods, by establishment of youth gardens and gathering of native plants, can play an important role in regaining health and independence for Native Americans.

Objectives: 1) To increase the number of gardeners and gatherers on the reservation, 2) To provide education on diabetes, and 3) To strengthen the connection to Mother Earth.

Methods: Winter meetings were conducted by producers and interested young people to learn and share information related to gardening, shelterbelts, and gathering of native fruits, nuts and berries. In the spring, internships were awarded to deserving young people and garden plots were planted under the guidance of strong adult leadership. Summer activities expanded to include beekeeping, gathering and drying of wild fruits, and horsemanship.

Results: In a community where gardening was nonexistent a few years ago, the activities of the leaders and interns have made a great difference, even though all of the expectations were not met. The original interns brought in friends to assist in gardening and gathering and have created interest in expansion of existing gardens and establishment of new gardens in 1999.

Professional Development Program

It may be that when we no longer know what to do, we have come to our real work, and that when we no longer know which way to go, we have begun our real journey. The mind that is not baffled is not employed. The impeded stream is the one that sings.

-Wendell Berry

WHO:

Teams developing sustainable ag education programs; educators learning about sustainable ag.

WHAT:

Competitive grants from \$10,000 to \$100,000 to develop training programs for ag educators.

WHEN:

Call for Proposals - DEC.;
Proposals due - FEB.;
Funds available - SEPT.;
training event dates vary.

WHERE:

North Central Region.

As they approach the next millennium, farmers and ranchers are asking new questions to sustain their production, income and way of life: How can I diversify for higher profits? make conservation plans? add value to products? support and involve my community? To help producers answer these and other questions, educators in the Cooperative Extension Service, the Natural Resources Conservation Service, and other agencies and organizations are learning more about sustainable agriculture.

Since 1994, Congress has annually appropriated USDA funds to teach agricultural educators about sustainable practices and concepts. Called the SARE Professional Development Program (PDP), this endeavor supports competitive training grants and state-specific planning that help agricultural educators assist producers in maintaining viable operations.

The PDP section of this report is divided into two sub-sections: competitive grants and state reports. One- to two-year annual grants are arranged by state. The NCR SARE PDP has awarded more than 50 competitive grants totaling more than \$3 million since 1994. In 1998, we added 10 projects, amounting to nearly \$400,000, to our PDP portfolio. New projects include topics such as gardening education on a Sioux Reservation, Management-Intensive Grazing workshops, farmland/land use policy workshops, and field crop ecology training and education.

State reports summarize activities sponsored by NCR SARE with funds distributed to 13 NCR land-grant institutions every year. In 1998, NCR SARE granted \$12,000 to each land-grant. Initially, each NCR state had one PDP coordinator (State Sustainable Agriculture Coordinator) directing sustainable agriculture activities — now most states have two, and some three.

George Bird, of Michigan State University, left his position as PDP coordinator in August 1998. The NCR SARE program thanks Dr. Bird for his great contributions to sustainable agriculture education. We also welcome Paula Ford to fill the PDP coordinator position in June 1999.

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Introduction to Management-Intensive Grazing Systems Workshops and Resource Manual for Educators

New Project, Proposal

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Funding:
SARE: \$32,308
Match: \$29,934

Duration:
September 1998 - August 2000

The project will provide professional development training at three regional workshops in management-intensive grazing systems to 75 Cooperative Extension Service, Natural Resources Conservation Service and Soil and Water Conservation District personnel. Participants will gain a general understanding of management-intensive grazing systems and will have the necessary resources to refer the clientele to appropriate experts and other sources of information.

A resource notebook will be developed that will be used in conjunction with the workshops and as a future reference guide. The workshops and related activities will increase the involvement of the University of Illinois Agroecology/Sustainable Agriculture Program (ASAP) in management-intensive grazing systems outreach as well as increasing the awareness of sustainable agriculture to workshop participants.

Legal Guide For Direct Farm Marketers

Annual Report

Project Coordinator:
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Funding:
SARE: \$36,250
Match: \$20,000

Duration:
September 1997 - August 1999

This project is for the publication of a thorough and concise legal guide written for farmers covering the main legal topics encountered in direct farm marketing. Topics discussed include: land use and zoning; real property issues such as nuisance and pesticide drift; labor and employment; insurance; contracts and getting paid; labeling and marketing; processed foods; meat and poultry inspection; and food safety. The book includes a discussion of the main forms of direct farm marketing with a discussion of operational and organizational concerns when forming a business, in addition to numerous checklists and other lists of steps to consider when addressing different legal issues. Frequent sidebar examples of real disputes, state and local laws, and practical examples help illustrate the discussion. The book includes a 50-state appendix of information concerning state laws, government contacts, private organizations, and other resource information for direct farm marketers.

Objectives of this project include: 1) To identify the practical legal and regulatory questions dealing with the direct marketing of fruits, vegetables, meat, poultry and other foods; 2) To fill the void faced by producers, USDA employees, and other agricultural advisors, resulting from the current lack of sources available to obtain answers to such questions; 3) To publish a legal guide book, developed in cooperation with an advisory committee of farmers, marketers, and agricultural officials, which answers the most commonly asked questions producers and advisors have relating to direct farm marketing; 4) To conduct two regional training sessions for key agricultural officials to determine how best to use the book in advising and educating farmers involved in direct marketing; and 5) To develop a set of teaching materials and a curriculum guide, which, along with a quantity of the books, will be delivered to each state.

Outlines have been completed for all the chapters. Final drafts are nearly complete. I am currently working on three major tasks: completing the remaining draft chapters, reviewing the entire book to insure all the different issues researched and the information identified are included in the coverage, and editing the full text for consistency.

The style and format of the final product has been selected. Once the draft chapters are printed the drafts will be submitted to the advisory committee and to other selected legal reviewers for their suggestions about the content and style of coverage. These comments and suggestions will be integrated into the final edit. My goal is to have the final book printed and available for distribution and sale by May 1999.

Multi-Agency On-Farm Sustainable Agriculture Training

Final Report

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Resources (DNR)

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Funding:

SARE: \$15,335
Match: \$5,610

Duration:

September 1997 - August 1999

Through this grant Practical Farmers of Iowa, in cooperation with Iowa State University Extension, organized and carried out three sustainable agriculture-oriented in-service training sessions on working farms in the summer of 1998. The objective was to acquaint participants, especially staff of agencies working in agriculture, with farm-based perspectives on issues ranging from water quality to direct marketing.

The three training sessions were formulated with input from a number of agencies, both federal and state, and drew on local resource people to address local priority issues. Presenters included farmers, small business people, rural development agents, university scientists, and agency personnel. The most effective sessions were those utilizing farmers and teams of farmers with other professionals. The training was well-rated by participants, but organizers learned much that will improve future agency and inter-agency events like these. The sessions also expanded the list of agency contacts on topics related to sustainable agriculture. The project methodology reflected the desire to take agency staff beyond the valuable-but-limited sustainable agriculture in-services that have taken place in conference centers and universities and introduce these staff to producers in their own environment. We felt this approach would better convey the complexity and immediacy of current sustainable farming issues.

In order to spur the active involvement of participating agencies, we met with administrators in February 1998 to formulate a syllabus for the three in-service events that would both satisfy the priorities of agency administrators and utilize the farmer skills that could be brought to bear. In the interest of reaching additional agency personnel, invitations were extended not only to the Extension Service and the NRCS, but also to the FSA, the DNR, and the IDALS. The consultations with agency administrators proved both stimulating and frustrating. In many cases these representatives made excellent suggestions regarding resource people. With agency concurrence, it was decided that the three in-service events would take place on farms in central, northeast, and western Iowa and would focus on: Issues around Integrated Farming (manure management, sustainable swine production, cropping systems); Quality Water, Quality of Life (water quality, intensive rotational grazing, and planning/decision making tools); and Building Markets, Building Communities (local marketing of hoophouse swine and other products, organic marketing and production, community strategies for agricultural development), respectively.

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Multi-Agency On-Farm Sustainable Agriculture Training

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We recruited farmers, agency personnel, and private sector individuals as appropriate for the themes chosen. The farms selected were: Central Iowa – Richard and Sharon Thompson farm, Boone; Northeast Iowa – Matt and Diane Stewart farm, Oelwein; and Western Iowa – Victor and Cindy Madsen farm, Audubon, and Ron and Maria Rosmann farm, Harlan. The western Iowa in-service event was divided into a morning and an afternoon session at two different farms in two communities. Each farm and each community has unique strengths that we wanted to capture. In order to emphasize the opportunities for farmer-staff collaboration, we featured, where possible, presentations that involved both farmers and professionals. It has also been our experience that this sort of presentation has the greatest credibility.

In all, 114 people participated in the in-services. Extension and NRCS were to be the primary agencies taking part, but more personnel from the Farm Services Agency attended. When registration from Extension and NRCS was coming in slowly, organizers decided to increase the number of scholarships available to FSA and IDALS personnel and the farmers they invited. And although the organizers of these events both work for the Extension Service, actual Extension attendance was nominal. There are at least three lessons here: 1) Promote events far ahead of time so that busy agency personnel can get them on their calendars. Promote them in ways that distinguish them from other training; 2) Take advantage of agency “chain of command” to publicize and recruit for such events. First notice went to Extension personnel via email from a little-known hourly employee. Other agencies put out the word from the top of the administrative structure and more-or-less assigned personnel to attend. Unfortunately, some attendees were there because they were new or low in the pecking order. But the organizations at least made the necessary concessions and arrangements for their employees to attend; and 3) SARE events potentially compete with each other. The week following the first two in-services, the NCR SARE workshop took place in Ames, Iowa and was attended by a number of agency personnel who would have been logical candidates for the on-farm workshops.

On the positive side, the process of putting together these in-services allowed Practical Farmers of Iowa to establish working relationships with NRCS, IDALS, DNR, and FSA. Both administrators and local staff of the agencies now have a better understanding of PFI, its resources and areas of interest. We in turn have been able to identify those agency staff who have a high level of interest/expertise in the topics of concern to farmers in sustainable agriculture. We now have a better basis for the next phases activity. Human resources identified through this project have already been utilized in other training.

Planning Sustainable Grazing Systems

New Project, Proposal

Project Coordinator:
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Livestock Committee
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Funding:
SARE: \$45,740
Match: \$75,960

Duration:
September 1998 - August 2000

Currently, the Southern Iowa Forage and Livestock Committee, with financial assistance from SARE and other sustainable agriculture organizations, sponsors a two-day grazing seminar. Producers are the target audience for this seminar. To reach more producers and be able to follow up with one-on-one assistance, more field staff of both the Natural Resources Conservation Service (NRCS) and the Cooperative Extension Service (CES) need training in the sustainable use of grazing lands. This proposal will provide training to such staff in Iowa on how to make Iowa grasslands more sustainable through the use of rotational grazing systems.

Field staff of both the NRCS and the CES will be the target audience. However, other groups such as Cow Herd Improvement Program (CHIPS) and Division of Soil Conservation employees, community college staffs, veterinarians and others that provide assistance to producers in pasture management will also have an opportunity to be a part of the training.

This training program will enhance the sustainability of grazing and grassland management by helping students learn the relationships between livestock management and forage management. Upon completion of the training, students will be better prepared to help producers in evaluating and developing plans to improve the sustainability of grazing systems.

Combining Holistic Resource Management and Strategic Planning to Improve Farm Resource Planning

Annual Report

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Funding:

SARE: \$9,500.00

Duration:

September 1997 - August 1999

The purpose of this project is to develop multi-disciplinary teams of extension specialists and county educators that can help farmers develop more integrated family and business plans. In-service professional development opportunities will be provided to educators and specialists in order to foster the development of teaching teams. These teams will then conduct workshops for farmers interested in developing and implementing farm plans that address quality of life questions as well as economic and production issues.

Specific objectives include: 1) Introduce the concepts and techniques from holistic resource management and strategic planning to extension educators; 2) Provide professional development sessions where extension educators will learn to apply holistic and strategic management tools to planning the farm business; and 3) Improve farmers' understanding and skills in utilizing holistic resource management and strategic management methods for the development and implementation of farm management strategies.

To provide extension specialists an opportunity to learn more about holistic management and the role that it can play in the management of production resources, Don Nelson from Washington State University was brought to Purdue. During this visit, Nelson met with small discussion groups, with members of the Animal Sciences faculty, and with members of the Sustainable Agriculture Team. He also prepared a videotape for use during an in-service training session on whole-farm planning.

In November 1997, an in-service training session on whole-farm planning and sustainable agricultural systems was conducted for county educators. Objectives for this session included: 1) defining whole-farm planning, explaining its importance, and applying it to Indiana agriculture, and 2) illustrating through a case study the importance of fitting economic, ecological, and social systems together.

In April 1998, an in-service training program addressing the use of strategic management was conducted. In addition to providing an increased understanding of strategic management, this session had the objective of encouraging the formation of instructional teams to lead farmer workshops. For the April session, material on the forces shaping agriculture, the use of vision and mission statements in developing goals, methods for implementing strategic plans, and procedures for assessing and repositioning the business was developed and presented. Teaching materials for each section of the program included visuals, reference materials, and exercises.

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Combining Holistic Resource Management and Strategic Planning to Improve Farm Resource Planning

... continued

As planned, educational opportunities for county educators and extension staff have been provided. Twelve Purdue Cooperative Extension county educators attended the November 18-20 session on whole-farm planning. There were five instructors for the sessions. These instructors included staff from the Purdue Cooperative Extension Service, a not-for-profit organization working in the sustainable agriculture, and one farmer. Twenty-four educators and one farmer attended the April session. The three instructors for this session were Specialists from the Purdue Cooperative Extension Service. While the number of attendees was not large, the sessions did attract those willing to make a commitment to these efforts.

Prior to the conclusion of the April session, several groups of educators agreed to participate as instructors and organize a farmer oriented winter school on the topic. Several others joined work groups to help refine various aspects of the material. As of this writing, farmer workshops for three areas of the state have been organized. Conducting these workshops is the second phase of this project. As planned, the instructors for these workshops included a team of county educators and extension specialists.

A formal evaluation of these sessions was not conducted, but those attending indicated that the sessions had been helpful. As usual several suggestions for improvement were made. The November session could have been improved through an increased level of planning and coordination prior to the session. While the diverse backgrounds of the instructors provided several important points of view, more time should have been spent getting the instructors to integrate their presentations. While we knew integration would be difficult, we underestimated the degree of difficulty and the time required. As others develop similar sessions, it is important to recognize that instructors will need to begin preparations sooner and meet more frequently to insure good integration.

Several suggestions for improvement were also made at the April session. This resulted in four work teams being created to help refine various aspects of the teaching materials. One of the objectives of the April session was to obtain agreement from county educators to participate in farmer workshops as an instructor. At this time, three such teams have been formed for conducting farmer workshops.

Accessing Community-Based Information Sources for Improving Surface Water Quality

Final Report

Project Coordinator:
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Funding:
SARE: \$14,300

Duration:
June 1996 - August 1998

The project's primary goals were to: 1) expose the participants to the concept of biological macro-indicator species, to the uses and limitations of biological macro-indicators in assessing surface water quality, and give them practical hands-on field experience in identification of biological macro-indicators and surface water quality assessment; 2) familiarize the participants to concepts related to surface water quality on a watershed basis and demonstrate downstream impacts by providing the opportunity for them to participate in hands-on water quality assessment exercises; 3) introduce the participants to a range of community-based resources outside the infrastructure of their respective agencies; and 4) help participants understand the basic tools used for on-site water quality analysis and develop a portable kit of sampling tools to be used when assisting clients.

The project consisted of two half-day training sessions, two half-day field sessions, post training individual site and phone consultations, program evaluations through both phone and site participant interviews, and a written survey. In March 1996, letters were sent to 22 Natural Resources Conservation Service (NRCS), Michigan State University (MSU) Extension, and Soil Conservation District (SCD) staff members. A total of 16 individuals agreed to participate in the project. The agency background of the participants was six NRCS, six MSU Extension, and four SCD staff members. The individuals ranged in tenure in their positions from eight months to 33 years. A total of 13 participants completed all four half-day training sessions.

The first half-day training session was a classroom session conducted in June 1996. The session presented basic concepts of stream ecology and the use of macro-invertebrates as indicator species as indicators of relative water quality. The training was held at the Robert B. Annis Water Resources Institute (WRI) on the Allendale campus of Grand Valley State University (GVSU) and was conducted by WRI staff members. There were 14 individuals who took part in the classroom training held at WRI.

The second half-day session was a field session also held in June 1996. The purpose of this session was to practice the concepts introduced in the previous session and to introduce participants to the water quality tool kit. Staff members from WRI facilitated the field session. The training was held at a small stream in northeastern Kent County. Participants received additional instruction on stream ecology and macro-invertebrates, as well as stream sampling techniques. They also received a basic water quality sampling kit containing a 5-quart plastic bucket with the bottom removed and replaced with a 1/4-inch rigid metal mesh screen and a fine flexible nylon screen. In addition, each participant received a stream thermometer and forceps. Participants then

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Accessing Community-Based Information Sources for Improving Surface Water Quality

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conducted a basic stream inventory and assessment, including the measurement of physical attributes such as temperature, estimated flow rate and volume, and structure and bottom condition. Macro-invertebrates were collected and identified. Participants were then asked to make a water quality assessment and to comment on management practices they would recommend to land managers to improve the stream water quality. Fifteen participants took part in this session.

The third half-day session was held in August 1996 aboard GVSU's research vessel G. Jackson. The participants received a briefing on water and sediment sampling techniques and collected samples from two locations in Muskegon Lake. An attempt was also made to collect samples from within the plume of the Muskegon River in Lake Michigan; however, weather conditions prevented successful sampling in Lake Michigan. These tests were similar to the tests conducted at the stream sampling field training so the participants could draw parallels during the debriefing. Participants conducted tests to evaluate physical characteristics including turbidity, dissolved oxygen, pH, and surface and depth temperature. Water and sediment samples were collected and the macro invertebrate populations were identified and evaluated. The staff of the G. Jackson facilitated a discussion on the water quality at the terminus of a watershed versus water quality at smaller streams within the watershed, and the impact of various management practices on downstream water quality. All 16 participants took part in this activity.

The final half-day training session was also held in August 1996 at the offices of the Muskegon County Soil and Water Conservation District. Project Manager Rich Bowman and Michigan NRCS sustainable agriculture training coordinator Larry Dyer conducted this classroom session. During the session, participants viewed a videotape on sustainable agriculture produced by Wisconsin Public Television and reviewed materials on water quality and related management practices from other states in the North Central region, including computer software. Participants were able to make copies of the materials relevant to their program activities. Eleven participants took part in this session.

Following the formal training program, individual interviews with 14 of the 16 project participants were conducted. Two of the interviews were not conducted because participants had left their positions with their respective agencies. Eight of the interviews were conducted in person during site visits and six were conducted by telephone. The interviews were conducted during July and August of 1997. A follow up written mail survey was conducted during April and May of 1998.

Participatory Learning between Farms and Field Crop Area of Expertise Team Members

Final Report

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MSU Extension Field Crop Area of
Expertise (AoE) Agents and
Specialists

Funding:

SARE: \$48,200
Match: \$32,400

Duration:

October 1996 - September 1998

Objectives of this project include: 1) To develop small teams of local innovators (farmers, Extension agents, Natural Resources Conservation Service (NRCS) personnel and others knowledgeable in sustainable agriculture) who will become highly skilled in key aspects of sustainable field crop systems, providing knowledge and leadership for widespread adoption of those practices. At a minimum, each team will include one agent, one farmer and one other local persons; 2) To translate the experience of the local teams through Area of Expertise agents, NRCS personnel and through existing networks to multiply sustainable agricultural programs on a local and state-wide basis; 3) To increase farmers and extension agents' awareness of new learning and teaching skills via hands on experiences and workshops; and 4) To network with NCR SARE PDP projects and utilize their training materials.

Michigan State University has several Area of Expertise (AoE) teams covering the state with the field crops team comprised of 24 multi-county extension agents and 16 campus faculty all working to provide local and state wide coverage to field crop producers and industries in the state.

Agents and specialists developed local learning teams, around a subject of interest and importance to their area. From this evolved 13 diverse projects, involving local agents, campus faculty and local farmer partners. These teams accomplished such learning activities as: 1) Five local discussion group meetings on organic production and marketing, which lead to an in-state tour of seven farms and a tour of 40 producers visiting Illinois and Iowa sustainable farmers. This project has created a dialogue between organic and traditional farmers that is most noteworthy; 2) Several tours visited a narrow row site plot and two educational sessions were held on the subject of narrow row systems (30" compared to 22 or 15"); 3) A large plot tour included stops to visit an alternative crop garden of seven species (sunflower, industrial rapeseed, flax, cuphea, canola, safflower) and soil quality measurements under reduced tillage where participants could see the soil structure differences; 4) Two agents worked with farmers to better understand manure nutrients compared to purchased fertilizers; 5) A computer assisted manure management model was taught at 11 different locations for agents and farmers; 6) GPS "tagging" of weed species at harvest lead to management strategies for perennial weeds; and 7) A project on rotational grazing tackled the typical, yet challenging, poorly drained fields that many beef cows are pastured on to find plant species compatible with the soil.

continued ...

Participatory Learning between Farms and Field Crop Area of Expertise Team Members

... continued

In-field demonstration plots with farmers included: organic soybean varieties compared for yield, protein and seed size; narrow row production systems in navy beans and sugar beets; clover interseeded into high-management wheat in five different locations showed the clover would survive in thick wheat stands and did not hurt wheat yields; new technology crops and herbicides showed the weed control and economic impact of these systems; and inter-cropping oats into adzuki beans demonstrated naturally reducing potato leaf hopper damage.

A traditional agronomy in-service training was expanded to a two-day event where each project reported back to the entire AoE Field Crops team with evaluations of the event being very positive. Not only has one agent learned more about a sustainable system but now all the AoE team members have been exposed to the projects. Each agent will then take these experiences back to many other farmers in many counties in the state. This provided an opportunity for the agents to gather their data into a presentation, which several indicated they will use to re-teach others at local extension meetings. Observing the agents' and specialists' presentations also provided some less tangible evaluation data such as enthusiasm, initiative, teamwork and ownership in learning by the individuals. Several projects have clearly demonstrated linkages that are bringing sustainable systems into the forefront of crop production and marketing in Michigan.

In-Service Training in Sustainable Agriculture and Agricultural Ecology for NRCS Personnel and Partners

Final Report

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Funding:

SARE: \$30,000

Duration:

October 1996 - August 1998

Objectives of the project were to: 1) enhance the understanding of ecological principles and their application to agricultural ecosystems, 2) develop skills in on-farm research, 3) train agricultural ecology trainers among Natural Resources Conservation Service (NRCS) personnel and partners, and 4) strengthen links and encourage collaborative efforts with Michigan State University Extension (MSUE) and the Michigan Agricultural Stewardship Association (MASA) to promote an ecosystem approach to agriculture. A central theme of the project has been to understand agricultural systems as ecosystems. The approach has been to work collaboratively to provide training in ecological principles as they apply to agriculture.

Conservation planning is the primary technical assistance responsibility of NRCS. Most of the project activities were aimed at incorporating an ecosystem approach to agriculture into conservation planning. This involved efforts at whole-farm planning, including an Ontario Environmental Farm Plan workshop. Managed Rotational Grazing was an important area of collaboration between NRCS, MSUE, MASA and other partners. Several activities involved technical training in aspects of agricultural ecology. One was a field day at the MSU Kellogg Biological Station (KBS) in which MSU researchers discussed research in the Long-Term Ecological Research Project, the Living Field Laboratory and the KBS Cover Crops Program.

Another field day, Enhancing Biological Pest Control with Filter Strips, presented results of on-farm research along with information about filter strips and other conservation practices. Some of the most encouraging results of this project came in training programs in Michigan Field Crop Ecology. These training programs were developed around a MSU Extension Bulletin, "Michigan Field Crop Ecology: Managing biological processes for productivity and environmental quality." The first program involved an intensive two-day session of technical training followed by a session in which the trainees became trainers and began planning programs for 1999. The resulting training programs that took place were well attended.

During most of the project it was difficult for people within NRCS to commit time for sustainable agriculture programming. People expressed interest and were receptive to new ideas, but participation in program activities was low. Farm bill demands were very high for the duration of this project. Technical training around any topic was minimal. Participation in the Michigan Field Crop Ecology training programs have been more encouraging. Michigan NRCS leadership appears now to be placing higher priority on technical training, and have expressed interest in incorporating agricultural ecology concepts into conservation planning. There is still a need to incorporate sustainable agriculture and ecological concepts into the training regime and culture of the agency.

Self-Directed, Participatory Learning to Increase Extension Agents' Sustainable Leadership

Annual Report

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Funding:

SARE: \$53,700
Match: \$32,400

Duration:

September 1997 - August 1999

The Michigan State University Field Crops Area of Expertise Team (AoE) consists of county agents and campus faculty all working together to provide local and state wide training for both themselves, agri-business personnel and farmers.

The second year of funding has provided the team with consistency to continue several existing local projects and to inspire agents and specialists to investigate new programs, relevant to their area. Three major areas of endeavor include local on-farm learning projects, agroecology training for agents and Natural Resources Conservation Service (NRCS), and the sharing of these experiences through the total AoE Team.

Four of the local projects that were instigated on farms in the 1996-97 season were expanded and continued in this season. The organic production network that began in Gratiot County has continued to grow and prosper and at the same time inspired three agents in the southwestern region of Michigan to begin the same process. The initial project demands a high degree of credit and respect from more than just a production perspective. A "traditional" ag agent has broken tradition, been successful and generated respect from many different facets in the state. The impact has and will continue to resonate state-wide.

Two cover crop projects are being followed through several years to assess the typical rotation on the farm and measure the impacts that are not always generated from one year of study. Alternative crops take several years of demonstration in cooperation with the farmers to become successful. Crop scouting with the aid of geo-referenced scouting equipment has been found to be only as good as the scout's dedication, i.e., technology still needs skilled and dedicated personnel to be successful. Two other projects are assisting farmers and agents to come together for the networking benefits of shared demonstration plots, one looking to purchase a permanent site for their plots.

There are a total of 18 locally generated projects funded by this grant. The ones mentioned above plus others focusing on crops to improve our northern economy such as birdsfoot trefoil, canola and leafhopper resistant alfalfa demonstrations. Manure nutrient management, composting and re-establishment of alfalfa on hilly ground are projects that greatly impact our livestock producers. All projects are on farms with close farmer interaction for the planning, implementing and evaluation of the systems. Two projects have involved farmer/agent trips around the state and to another state for continued experiences and interactions.

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Self-Directed, Participatory Learning to Increase Extension Agent's Sustainable Leadership

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MSU has recently published *Michigan Field Crop Ecology*, a 118-page publication that has won the American Society of Agronomy's award for best extension publication over 15 pages. A special emphasis is now to extend this information out to agricultural producers across the state.

Two workshops were conducted in September and October 1998 to teach MSUE agents, NRCS staff and other agency personnel about basic field crop ecology. Six authors of the bulletin facilitated this program for nine MSUE, seven NRCS, two Michigan Department of Agriculture (MDA) and one Michigan Integrated Food and Farming Systems (MIFFS) representative.

The first session introduced participants to this new way of approaching agricultural systems, while the October program included a planning session for four regional winter meetings. The same six authors will present field crop ecology workshops for participants from fall sessions, plus other agency staff and farmers. The winter meetings will bring those interested in sustainable agriculture together, with the intent of ultimately creating a statewide network. This network will function similar to the grazing network providing participants access to farm-based information and educational opportunities.

The annual agronomy in-service training for extension field crop agents and campus faculty will be in December 1998. At this time, all agents with projects will share their production findings along with reflection on how projects are progressing and the value of these projects to their professional development. The group will print their third year of findings, and this season that publication will include a detailed, color section on SARE projects.

Improving the Environment for Community-Supported Agriculture in Michigan, Ohio and Indiana

Annual Report

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Funding:

SARE: \$23,966
Match: \$3,541

Duration:

September 1997 - August 1999

Community-Supported Agriculture (CSA) is a model that holds great potential for supporting small, diversified farmers and providing area residents with fresh, locally grown and minimally processed food and fiber. It is at once a way of marketing local produce and of building community around the activities of agriculture and food production. CSA encourages growers and eaters to interact, to share the risks and rewards of farming, to learn more about each other, their environment and their food system. The long-term benefits of such a relationship are greater food security and local self-reliance.

While CSA provides an alternative to the dominant, long-distance food system, the concept is not wide-spread and CSAs are themselves quite vulnerable. Individual farms are small and labor intensive. Typically, they operate with severely limited capital and material resources. CSAs are likewise without supporting networks or infrastructure to minimize the impact of economic and production short falls and to assist with consumer education. These conditions are particularly pronounced in Michigan, Ohio and Indiana.

Three non-profit organizations, the Michigan Organic Food and Farming Association (MOFFA), the Ohio Ecological Food and Farm Association (OEFFA) and Sustainable Earth, Inc have joined forces to promote greater public awareness and support for CSA in each of their respective states. To this end, they have researched and will publish a CSA directory, *The Many Faces of Community Supported Agriculture: Michigan, Ohio and Indiana*. The directory profiles existing CSAs in all three states and makes recommendations to extension personnel, community planners and activists for publicizing the CSA concept and addressing the problems currently faced by these small, diversified farm enterprises. Copies of the finished work will be distributed free of charge to every county extension offices in all three states. Remaining copies will be sold by MOFFA, OEFFA, and Sustainable Earth, Inc.

An annotated slide show, *The ABCs of CSAs*, has also been created to accompany the directory and will be used as yet another extension and public education tool. Dialogue between the three non-profits and individual CSAs is presently underway to determine how best to develop inter- and intra-state CSA networks.

Specific objectives of this project included: 1) To increase extension awareness of the CSA concept, its potential and presence in Michigan, Ohio and Indiana; 2) To increase public (grower and eater) recognition of CSA in Michigan, Ohio and Indiana as a model for local food and farming; and 3) To develop instruments to enable dialogue and collective action among CSAs and CSA advocates in Michigan, Ohio and Indiana.

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Improving the Environment for Community Supported Agriculture in Michigan, Ohio and Indiana

... continued

An evaluation of the first year's activities must be limited to the field research experience and to the development of written and visual educational materials.

Project principles worked closely to develop interview protocols (telephone and farm-site) and deadlines prior to the actual CSA visits. This joint preparation was critical and allowed researchers to accommodate individual interests and anticipate possible problems; it also lent consistency to the data collection. CSA grower/member's response to the project and to on-farm visits was positive. No one refused to participate and all spent 30 minutes to one hour on the phone during the initial interview. The only difficulty encountered was that of scheduling farm visits at a time that did not interfere with demanding pace of farm work. Visits, as a result, were made after the initial planting was done (i.e., mid-June) and often in the afternoon on a distribution day—a time which offered the farmer some leisure and also made it possible to talk with share members.

It should be mentioned that a one-page member survey was also developed, but did not prove successful (i.e., few were returned). Two reasons for this can be cited. First, we asked CSA growers/coordinators to help us distribute and collect the surveys; this was an unreasonable imposition on their time. Second, most CSA growers/coordinators conduct their own member surveys at the end of each season; taking the membership's 'pulse' too often can be tiresome and anti-productive. For our purposes, the characteristics and attitudes of CSA members were adequately assessed using past survey findings, interviews and direct observation.

Each non-profit selected extremely capable field workers, people skilled at interviewing and sensitive to the demands of small-scale farming. The CSA profiles, as a result, were well written and needed only minimal editing. While project participants periodically up-dated each other via e-mail and telephone, these channels of communication were not equally useful for developing a slide show presentation or for reviewing slides. A day-long meeting was held in Plymouth, Ohio for this purpose. Once again, all project participants were prepared, shared resources, and contributed to the design of the program. While work-focused, this face-to-face meeting also lent a pleasant social atmosphere to the overall project — a remind of how important real (v. electronic) encounters are for creating affective (and effective) relationships and for building personal and social networks. This project was a first for the three nonprofits; it is quite likely the MOFFA, OEFFA, and Sustainable Earth, Inc., will collaborate on other direct marketing and food systems projects.

Michigan Field Crop Ecology: Training and Field Demonstrations

New Project, Proposal

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Funding:

SARE: \$47,677

Duration:

September 1998 - August 2000

Self-directed, locally based sustainable agriculture innovation teams conducting 13 on-farm projects have provided momentum, credibility and risk-taking by Extension agents. The Extension Field Crops Area of Expertise (AoE) Team is organized and prepared to expand their professional development by intensive learning and re-teaching sustainable principles. Utilizing the newly published *Michigan Field Crop Ecology* book as a training tool, Extension agents, Natural Resources Conservation Service (NRCS) and farmer leaders will conduct six regional trainings. A mixture of professional development activities for the AoE team agents will include class room learning, re-teaching, on-farm demonstrations with farmers, networking with organic/sustainable groups and travel experiences that will broaden Extension agent's and NRCS personnel in their pursuit of sustainable on-farm systems for Michigan agriculture.

Objectives of this project include: 1) Expand the basic sustainable agriculture knowledge of Michigan agriculturists (farmers, NRCS, Extension, agri-business) by presenting six regional trainings on field crop ecology, presented by a core group of trained agents, NRCS personnel and/or other trained people; 2) Continue and enhance learning through 10 local sustainable agriculture innovation teams conducting on-farm projects involving Extension agents, farmers, NRCS staff and others, to gain practical knowledge and leadership for widespread adoption of more sustainable approaches; 3) Use Michigan's Field Crops AoE team as a clearinghouse to compile local invention team and agent experiences for sharing with other agents and NRCS staff, and draw upon AoE team resources to support local efforts; and 4) Expand interaction between Extension agents and sustainable/organic practitioners through greater agent involvement in farmer organizations, projects and events.

The approach and methods to achieve this proposal will involve: 1) Re-teaching of field crop ecology materials; 2) On-farm demonstrations that enhance sustainable practices; 3) Extension agents and specialists networking with other professionals and farmers; and 4) Sharing back of information by AoE agents to other agents, professionals and farmers in the state.

Decision Cases for Sustainable Agriculture: A Video Training Project for Professional Development

Final Report

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Funding:

SARE: \$52,380
Match: \$12,800

Duration:

October 1996 - August 1998

A decision case is a discussion tool that uses a real-life person who must make a decision. Often the decision is not clear and may have many possible alternatives. Participants of the discussion are placed in the decision maker role to identify the key issues of the situation, what the outcomes might be, and options in dealing with the dilemma. The discussion is beneficial because participants are exposed to many perspectives while at the same time are empowered to think for themselves about the issues.

The University of Minnesota developed three decision cases for water quality and feedlot issues. The Minnesota River Basin cases look at the installation of vegetative buffer strips along a county ditch; the adoption of no-till as part of a Conservation Compliance plan; and the siting of a hog confinement unit. Decision cases in this series include a description of the dilemma, a teaching note containing possible uses of the case, an outline of the dilemma, potential discussion questions, and a slide narrative.

The University of Minnesota also produced two videotapes on decision cases. "Orchestrate Active Learning: An Introduction to Decision Case Teaching" gives a 21-minute overview on how to teach a decision case. While the idea of using decision cases to facilitate discussion can seem daunting to those new to the method, this video provides a comprehensive overview of decision cases and gives all the information needed to begin using the tool.

"Anybody's Dream: A Decision Case on Marketing Alternative Crops" is a decision case portraying the dilemmas of the Buckwheat Growers Association in central Minnesota. The farmers need to decide how they will organize themselves to be profitable. The question is will they stay an association or become a cooperative. They also need to determine how they will market the buckwheat — will it be on a local, national, or international level.

Minnesota Sustainable Farming Association Chapter Networking

Annual Report

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Funding:

SARE: \$41,600
Match: \$19,800

Duration:

September 1997 - August 1999

The Sustainable Farming Association (SFA) of Minnesota's Chapter Networking project provides continuation and expansion of the SFA of Minnesota's networking and educational programs. SFA members have been hosting farmer-led, on-farm field tours for many years in Minnesota. It is very valuable when a field day is followed by a workshop with more detail being presented on the topic. It has been recognized that networking with other agriculture organizations and agencies can have a great effect on the community discussions and solutions for and about agriculture. Professionals from other agriculture organizations and agencies have been specifically invited to the on-farm, farmer-led events. Networking between agricultural professionals, conventional farmers, and the 12 chapters of the SFA of Minnesota is the focus of this project. The SFA can be the link to strengthening these relationships.

Half of the chapters have further developed their lists of agriculture professional offices, identified contacts at these offices, and have specifically invited these contacts to local events. Half of the chapters have also further developed the resource list of SFA farmer members, identified by product or area of expertise, as field day hosts and presenters at workshops. Local food products are served at events to emphasize the importance of the producer-consumer link — making the connection. Networking with agricultural professionals to attend, co-sponsor, and help to announce field days, hosted by farmers, and workshops with farmers presenting information on sustainable farming systems and practices, has enhanced participation at events when this networking has been emphasized and accomplished. Field days have been hosted by four of the 12 chapters, with more than 120 people attending and more field days being planned. A field tour work plan has been developed as a document which, when utilized by chapter coordinators planning events, will assist in making sure important details are covered.

As lists are being further developed, the importance of efficient data management has been recognized. This data is used for announcing events and so far more than 200 names have been added to the *CornerPost* (SFA newsletter) mailing list. This list includes Extension, Natural Resources Conservation Service employees, Soil and Water Conservation District employees, Department of Natural Resources employees, and policy makers. Mailings are being sent by bulk mail whenever possible to save on postage. The *CornerPost* includes a calendar of events, which is a valuable resource for those receiving this newsletter to plan to attend specific events or to schedule their local events. Event announcements are included on the Minnesota Institute for Sustainable Agriculture website calendar and in the University of Minnesota Extension *Sustainable Agriculture* newsletter.

New Opportunities for Families on Small Farms

Annual Report

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Funding:

SARE: \$30,000
Match: \$26,539

Duration:

September 1997 - August 1999

A comprehensive professional development experience was carried out in conjunction with the 1997 *National Small Farm Today (SFT) Conference and Trade Show* in Columbia, Mo. The Small Farm Conference is an annual event sponsored by the *Small Farm Today* magazine and is held in Columbia, Mo., each November. The conference included nationally known speakers and experts on various aspects of farming; however, most speakers are just plain small farmers who are making their farming systems work. More than 2,500 people from more than 20 different states attended the 1997 conference.

A special professional development program (PDP) preceding the opening day of the SFT seminar and trade show featured Diane Kaufmann, president of the National Pastured Poultry Association, and Ed Fletcher of Wilcox Natural Products (Medicinal Herbs). Presentations and discussions were followed by a reaction panel discussion that included two Missouri Small Farm Educational Assistants and two PDP participants from other states.

Small groups of PDP workshop participants were then given team assignments based on case studies representing different small farm situations. The assignment included: 1) Listening to seminar speakers, talking with trade show exhibitors, and asking questions, 2) Making individual and collaborative assessments of the economic, ecological, and social sustainability implications of different ideas, enterprises, methods, or products at the seminar and trade show, and 3) Developing a team report concerning new opportunities they discovered for the families on their case study farms.

Each team included two or more Small Farm Family Educational Assistants, at least one Extension Specialist, and was as diverse as possible with respect to home-state, farmer/non-farmer, and specialization by discipline, commodity, or type of farming. The presence of SFFP Education Assistants on each team helped create a co-learning situation between those with stronger backgrounds in sustainable agriculture and those with more experience in addressing the unique information and educational needs of small farm families.

A total of 42 people from seven different states attended the PDP - not including speakers. Participants were asked for written evaluations at the end of the program. Evaluations were very positive with many complementary comments. In addition, participants were asked to rank on a scale of one to 10 (10 being highest): 1) What they gained in understanding and knowledge, and 2) The usefulness of what they learned in carrying out their work back home. The average rating for understanding and knowledge was 8.3 and the rating for usefulness was 8.3 as well - indicating a highly positive evaluation in both categories.

Alternative Information Networking to Support Sustainable Agriculture on Small Farms

New Project, Proposal

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Funding:

SARE: \$32,950
Match: \$19,000

Duration:

September 1998 - August 2000

This four-state program will give Extension agents, Department of Agriculture and Natural Resources Conservation Service personnel, and other information providers in the North Central region quick and easy access to a full range of sustainable agriculture resources. Small farm families clearly need this information so they can explore alternatives to traditional enterprises and ways to fit new alternatives into sustainable whole-farm systems. The 1997 USDA Small Farms Commission hearings confirmed that traditional agricultural extension programs are not meeting the needs of small farmers. This program will help information providers supply families on small farms with the most effective alternative agriculture information and education programs available.

The overall goal of this program is to provide quick and easy access to the resources extension agents and other information providers need to provide families on small farms with the most effective sustainable agriculture information and education programs.

Specific objectives for 1998 include: 1) To develop a North Central Sustainable Small Farm Information Network (NC-SSFIN) that gives every extension worker and information provider in the region quick and easy access to the full range of sustainable agriculture resources available for small farm families; and 2) To develop prototype information resources that will be used by the network, including an up-to-date and easy-to-use Sustainable Agriculture Resource Guide that lists organizations, educational opportunities, and grants that support non-traditional farm enterprises and sustainable agriculture strategies that are of particular value to small farm families.

North Central Sustainable Agriculture Training Project

Final Report

*This abstract summarizes
four years of training programs.*

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Team Members:

*From the beginning, the NCSATP
strategy was inclusive, involving
Extension, state and federal agencies,
nonprofit organizations, farmers, and
other interested people in planning and
implementation.*

Total Funding:

SARE: \$503,070
Match: \$557,608

Duration:

September 1994 - December 1998

The North Central Region SARE Administrative Council awarded a region-wide professional development program grant under the joint leadership of Charles Francis, University of Nebraska, and Clive Edwards, The Ohio State University. The North Central Sustainable Agriculture Training Program (NCSATP) grant was funded from September 1994 through December 1998.

During this time, NCSATP sponsored an initial planning meeting, 10 train-the-trainer workshops, and three year-end planning and review meetings. The number of participants at meetings and workshops was 853. This figure does not include the people who participated in events and tours sponsored by the NCSATP Minigrant Program. The audience background at meetings and workshops was variable, including Extension and university representatives, nonprofit organizations, state and federal agencies, producers, students and individuals from the private sector.

Two guiding principles emerged from the first planning meeting held in January 1995: 1) Sustainable agriculture must be viewed in a complex framework of social, economic, and environmental factors, and 2) Training must be inclusive, both in terms of trainers and audience. In reference to the second principle, 270 people presented at NCSATP workshops, meetings, minigrant events, and tours. The speakers' backgrounds were Extension and university (47 percent), nonprofit organizations (11 percent), state and federal agencies (16 percent), producers (22 percent), and private sector (4 percent).

Also based on participants' comments, workshops were not held on university or college campuses. People wanted a site away from distractions and one that would show an application of concepts, such as on farms or near conservation projects. Workshops were cosponsored by state teams in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Ohio, and Wisconsin. Agendas always included touring farms or research stations and learning from producers. For instance, farmers designed discussions, prepared decision cases, and led pasture walks.

To reflect the need for a high degree of participation by everyone involved in education and training for sustainable agriculture, the title "Everyone a Teacher, Everyone a Learner" was chosen for 1995 activities. Workshops explored economic, social, and environmental aspects of sustainable agriculture, using a wide variety of learning methods and evaluation techniques. Examples of subjects included Definition of Sustainable Agriculture, Social Issues Related to Agriculture, Integrated Crop and Animal Systems, and Decision Case Studies.

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North Central Sustainable Agriculture Training Project

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At the December 1995 planning and review meeting, participants identified coalition building, facilitation skills, and political and environmental issues as principal elements needed in future workshops. Therefore, the theme for the 1996 workshops was "Shared Leadership, Shared Responsibility." Because an entire day was spent on training in transformational leadership, concurrent sessions were run on two afternoons. Most of the topics had been recommended at the December meeting, such as Approaches to Whole-Farm Planning, Financial Analysis for Sustainable Agriculture, and Using Study Circles in Sustainable Agriculture Training.

What is it about a natural ecosystem that lets it function year after year using only solar energy without degrading the resource base, while agroecosystems on farms and ranches require high fossil energy inputs and suffer from soil erosion and water contamination? This question was explored at the 1997 workshops, "Linking People, Purpose, and Place: An Ecological Approach to Agriculture." The intention was to demonstrate how an understanding of ecological principles can help us design farms and ranches that provide commodities while retaining some of the beneficial processes of natural systems, such as clean air and water and biodiversity. Because agroecosystems include people, another goal was to explore characteristics of local communities that promote sustainability.

The title of the 1998 workshops, "Facing a Watershed: Managing Profitable and Sustainable Landscapes in the 21st Century," reflected a primary interest of Midwestern educators. Everyone lives in a watershed, and watershed boundaries define natural management units for hydrological, water quality, and other environmental issues. Each workshop watershed was influenced by a different combination of land use pressures—urbanization, tourism, and large-scale row cropping. Sessions highlighted interactive and hands-on exercises tailored to regional problems. Participants went home with skills and materials they could use in local planning efforts.

Evaluations were used at the training workshops and planning and review meetings. Questions were quantitative and qualitative, and all forms had a comment section. The remarks provided insight into what worked and what areas needed improving. The responses were also used by the planning committees for organizing the next round of workshops.

A call for proposals was announced each year from 1995 through 1998. The two categories were Speakers for In-State Sustainable Agriculture Training and Special Topic Training Tours. These categories were identified in the NCSATP grant and given high priority by state sustainable agriculture leaders. The goals of the Minigrant Program were to: stimulate the exchange of ideas, information, and materials across states; test alternative learning methods; give educators on-farm experience with various systems; and provide in-depth training on sustainable agriculture issues

Recipients of the minigrants included Extension, farmers' networks, and nonprofit organizations. Groups were encouraged to apply and work together, and the activity had to support the state strategic plan. Groups in all North Central states competed, except Minnesota and South Dakota. Thirty-eight proposals were received, and all were funded. A typical grant was from \$1,000 to \$1,500. Grants helped support 47 speakers and 17 tours. Principal investigators were required to submit a final report that included quantitative and qualitative evaluations and suggestions for other educators. Recipients commented that minigrants helped leverage funds or provided programming opportunities they could not afford otherwise.

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North Central Sustainable Agriculture Training Project

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The overall goals for NCSATP were: 1) to develop and implement a comprehensive education program for use throughout the region, and 2) to prepare a cadre of teachers to conduct innovative training in their own states. We met these goals by practicing shared leadership with diverse state teams to plan and conduct workshops, developing educational materials and evaluation documents, sponsoring a Minigrant Program, and hosting annual planning and review meetings. After four years, NCSATP has made a difference in state sustainable agriculture training and provided professional development for participants.

Impacts from the program include: 1) Materials, interactive methods, and speakers from the workshops have been incorporated into state training curricula; 2) More farmers are giving presentations; 3) Networks among educators in sustainable agriculture have broadened across the region; 4) Some participants have had a change in attitude regarding sustainable agriculture; 5) More people with different backgrounds are being included in planning and delivering educational events; and 6) The workshops instilled a sense of community and “recharged batteries” for those participants who feel isolated in their daily work environments.

The following comments help summarize the NCSATP:

“The NC Regional SARE Chapter 3 project has been a tremendous help to us in Missouri in getting our state professional development programs going. We have never sent anyone to a regional workshop that did not come back to Missouri more inspired and more dedicated to making something good happen for sustainable agriculture programs in Missouri.”

Missouri Sustainable Agriculture Coordinator

“In conjunction with our own continued efforts to increase cooperation between Extension and nonprofits, SARE trainings have provided us with a forum that has raised the bar for Extension and nonprofit collaboration.”

Ohio Nonprofit Representative

“The farmers I work with who attended this workshop have formed an even closer working relationship than they had before the trip. In addition to the information we learned at the workshops, traveling together gave us a chance to get to know each other better and discuss plans for the future.”

Michigan Nonprofit Representative

Strengthening the Whole-Farm Planning Process through Producer-Agent Partnerships and Professional Development

Annual Report

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Farmers

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Ranchers

Funding:

SARE: \$74,956
Match: \$49,420

Duration:

October 1996 - September 1999

Whole-farm plans allow farmers and ranchers to view and manage their operations as biological systems, so that dependence on purchased inputs may be reduced and nutrient cycles may be closed. The goal of this project is to build partnerships among farmers, ranchers and agency personnel through classroom and on-farm training events, so that they can learn how to build effective, whole-farm plans from and with each other. This project is strengthening whole-farm planning efforts in Minnesota and Nebraska. In 1997, we trained 53 farmers, ranchers, non-profit representatives, Natural Resource Conservation Service (NRCS) agents and Cooperative Extension educators in the use of a site-specific, goal-oriented planning model (Holistic Management) to develop and evaluate whole-farm plans. Ninety-two individuals participated in six follow-up workshops which addressed communication and goal setting, testing guidelines, biological and financial planning, and monitoring progress towards whole-farm plans. In 1998, 37 participants were trained in the use of decision cases in whole-farm planning.

On-farm workshops encouraged participatory learning strategies and team approaches. At each workshop, small teams including Extension, NRCS, and farmer participants spent a day listening to a farm family's goals and evaluating their system. At these on-farm workshops, participants experienced a variety of sustainable farming practices including management-intensive grazing, crop rotation, strip cropping, grazing maize, walk-through flytraps, and alternative crops and livestock. Everyone who participated in the on-farm workshops said they clearly saw the benefits of working in teams. Decision case study workshops addressed the use of these studies as learning tools and presented facilitation techniques for teaching with decision cases. After completing these workshops, participants held a medium-high opinion of decision case studies as a discussion tool for whole-farm planning and as a way to gain an understanding of planning options. Several Nebraska participants felt that there is a need to develop new decision cases that address whole-farm decision-making.

Participants completed a written evaluation and/or paired-interview at the completion of each training event. Evaluation results were extremely positive. After completing this training program, a Minnesota NRCS representative commented, "I am better able to help farmers consider goal setting and provide ongoing help to enhance grazing and land planning. I'm able to look at overall plans better and realize that decisions should involve more people." In 1999, the project will provide additional training in whole-farm planning. NSAS will work with Nebraska's sustainable agriculture training program to provide Holistic Management training and on-farm workshops to 50 additional Extension Educators and NRCS agents. SFA will co-sponsor whole-farm planning field days and workshops with Extension and NRCS. Both organizations will interview participants to learn how they have applied what they learned.

Marketplace '99

New Project, Proposal

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of Agriculture

Funding:

SARE: \$12,600
Match: \$1,200

Duration:

September 1998 - August 2000

Marketplace is an annual educational event which attracts thousands of people who are seeking opportunities in business and agriculture. The event was begun in 1988 by U.S. Senator Kent Conrad and then North Dakota Commissioner of Agriculture Sarah Vogel to provide ideas to rural residents whose farms, ranches, and communities were feeling the stress of financial hardship and loss of rural population. The event has proven to be extremely successful in providing ideas for enterprise expansion and business development. It is a showcase of private and public knowledge and experience which unselfishly seeks to assist participants be profitable and successful. Not only is individual success nurtured, but community development is also fostered through workshops and exhibit participants.

This proposal would provide scholarships to cover travel expenses for two individuals from each of the eleven other states in the North Central region to attend Marketplace in 1999. This will be the 10th anniversary of Marketplace and plans are to celebrate with new and special events. The basic offerings of information booths and educational workshops that have been the hallmark of this popular event will again anchor the program. It is anticipated that attendees will gain valuable ideas, information, and resources that can be shared within their states.

Revitalizing Community Development in the Dakotas

New Project, Proposal

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Funding:

SARE: \$64,700
Match: \$28,850

Duration:

September 1998 - August 2000

Sustainable agriculture professional development in North and South Dakota has given introductory education in environmental, profitability, and social aspects of a sustainable agriculture to Extension agents, NRCS staff, SCD technicians, FSA personnel, and other federal and state workers. The program has also given intermediate training to these groups in production practices and resulting environmental effects, in alternative marketing methods, and goal development and decision-making according to the Holistic Resource Management model. The area that has not received this level of attention is the socio-economic and quality of life issues especially as they relate to communities and their long-term viability.

Professional development educational activities proposed for 1999 will focus on these issues in providing Extension educators and others with key skills necessary to help them work integrally in their communities with these stifling rural dilemmas. The goal of this training is to develop strong community developers and builders who will understand the intertwined relationship of the communities and the farms, the effect of diversification on farms and communities, the community's economy and structure, and to be able to identify windows of opportunity to improve both standard of living and quality of life. Coupled with ongoing training to develop facilitation and leadership skills, this effort will produce agents of change for rural betterment.

Utilizing Whole-Farm Planning to Educate Agricultural Professionals and Farm Families About Sustainable Agricultural Practices

Final Report

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Funding:

SARE: \$32,000
Match: \$52,000

Duration:

September 1997 - August 1998

Members of OSU's Sustainable Agriculture Team, which includes representation from Innovative Farmers of Ohio, Ohio Ecological Food and Farm Association, Natural Resources Conservation Service (NRCS), Ohio Agricultural Research and Development Center (OARDC), and OSU Extension planned and conducted a Whole-Farm Planning workshop in four locations in Ohio in November 1998. The goal of the workshop was that agriculture professionals, working with farmers, would learn about the various tools available to help farmers plan their business to balance profitability with community and environmental vitality.

The three goal setting models, Holistic Management, Management Excel, and NRCS Conservation Planning, were discussed in overview sessions and then applied in breakout sessions with case farms. Decision-making, monitoring and assessment tools discussed included FINAN, Planetor, Farm*A*Syst, Organic Farm Planning, Ontario Environmental Farm Planning, and Holistic Management. All participants received a copy of the University of Minnesota's Whole-Farm Planning Guide.

A total of 22 Extension Personnel, 65 NRCS/SWCD Personnel, one Farm Bureau, one news media, four FBPA instructors, and 18 farmers attended the sessions. The meetings were evaluated by participants. Fifty-two of the 57 respondents indicated that they would use information they received as they work with farmers. The survey also asked what areas they would like additional training. The two areas where agency personnel indicated they would like more training was in Holistic Management and Ontario Environmental Farm Plan. Workshops have been scheduled for statewide workshops in these two areas.

Another method of supplying whole-farm planning information to professionals is to develop an Ohio Whole-Farm Planning Guide. This packet will feature a series of seven fact sheets on various whole-farm planning topics including: Holistic Management, Whole-Farm Planning Resources, Goal Setting, Organic Farm Planning, On-Farm Research, Monitoring Tools, and An Introduction to Whole-Farm Planning. The guide will also feature quotes from Ohio farmers who have utilized various whole-farm planning tools. The guide will be distributed to Extension Agents, NRCS personnel, Ohio EPA, Ohio Department of Agriculture, Innovative Farmers of Ohio, OEFFA, and others.

Soil Quality and Soil Health: Professional Training, Educational Materials and Assessment Tools for Ecological Soil Management

Annual Report

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Funding:

SARE: \$15,400

Duration:

September 1997 - August 1999

The purpose of this program was to train Extension and Natural Resources Conservation Service (NRCS) personnel, crop consultants, farmers, and members of other agencies and agricultural groups in the principles of soil quality and soil health from an ecological perspective. The program provided teaching materials and assessment tools, along with training in their effective use, so that future educational efforts in the participants' communities will encourage and assist farmers to make the transition from conventional to alternative management systems.

An in-service training workshop titled "Soil Quality and Soil Health" was held at two OSU locations in January 1998: 145 people attended in northern Ohio and 95 in southern Ohio. Fred Magdoff of the University of Vermont was the keynote speaker. He gave presentations on organic matter management and nutrient cycling and nitrogen management. A farmer from north-western Ohio discussed sustainable soil management practices used on his farm. Other presentations included methods of measuring and assessing soil quality, initiatives of the Soil Quality Institute, and a video picturing "Life in the Soil." A notebook with 25 articles and papers on soil quality was given to each participant for future reference.

Four educational modules were developed: 1) Soil Quality: What Is It? and Why is it Important?, 2) Soil Biology and Organic Matter Management, 3) Nutrient Cycling and Maintaining Soil Fertility, and 4) Soil Tilth: Managing and Improving Soil Physical Conditions. Each self-contained teaching module consists of a set of 35-mm slides, a set of overheads, speaker's notes and other teaching guides, and handout/reference material. A set of these materials is available for use in each of the five Extension Districts in Ohio, as well as in the offices of the Ohio Ecological Food and Farm Association and the Innovative Farmers of Ohio. They are intended for use by anyone who wants to put on a soil quality program. In addition, the video "Life in the Soil" (Nature Farming International Research Foundation), a (ARS) Soil Quality Test Kit, and a soil health scorecard are available at all seven locations. The Soil Quality Test Kit is both a teaching and on-farm soil assessment tool. The Ohio Soil Health Card was developed by farmers for farmers using a participatory approach designed by the Soil Quality Institute. It provides a simple way to assess soil conditions and identify areas that need more detailed evaluation.

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Soil Quality and Soil Health: Professional Training, Educational Materials, and Assessment Tools for Ecological Soil Management

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A second set of in-service workshops, "Putting Soil Health Into Practice," was held at four locations in October 1998. Total attendance for the four sessions was 145. This in-service was in two parts. The morning session introduced the teaching materials for the four educational modules. The afternoon session consisted of applied, hands-on exercises that gave participants the chance to examine soils of different types, under different management, and with different properties; see examples of the many organisms that inhabit soil and affect its condition; and use the Soil Quality Test Kit and Soil Health Card to evaluate different soils and composts. In both sessions of this workshop, the emphasis during discussions was on practical soil management practices that can maintain or improve soil quality and health. Handouts and reference materials were also provided for each participant. Most participants reported that they plan to use the educational materials developed through this grant.

This project was very successful in developing partnerships between OSU Extension, NRCS, IFO, farmers, and other Ohio farm organizations. Individuals from a variety of organizations had the opportunity to interact, get to know one another, and learn more about the nature of each others organization or farm. This was true for both those on the grant planning committee and for those who attended the workshops. These relationships should foster more collaborative efforts in the future to work together toward common goals.

Although this project is a professional development program targeted to Extension and NRCS personnel, a large portion of the ultimate audience for the information will be farmers, so it was important that the knowledge these professionals acquired was relevant to farmers' needs. The OSU Extension Sustainable Agriculture Team, which includes members from several farm groups and NRCS, also reviewed materials for their relevance and suitability. Results from participant evaluations following the first set of in-services were used to refine and further develop the agenda and educational materials for the second set of in-services.

Developing Advanced Grazing Educational Materials and Schools on Sustainable and Profitable Grazing Systems for the North Central Region

New Project, Proposal

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Experimental Watershed
USDA ARS

Funding:

SARE: \$60,000
Match: \$48,000

Duration:

September 1998 - August 2000

Management-Intensive Grazing (MIG) systems for ruminant livestock are productive, profitable and environmentally friendly. This project will build on a prior grazing education grant provided by SARE funds. As a part of that project, 12 teaching modules covering introductory and intermediate topics were developed. Train-the-trainer workshops for Extension, Natural Resources Conservation Service (NRCS), local soil and water conservation organizations, farm lenders, environmental organizations and high school agriculture teachers were held in Indiana, Illinois, Michigan, Missouri, Iowa, Nebraska and Ohio.

This project is the next step in restoring a competitive advantage to ruminant livestock production in the North Central region. With an environment of increasingly freer trade around the world, the pressure on the North Central region's livestock producers to compete with the low-cost producers in New Zealand and Argentina can only increase. This project will develop advanced topics such as leader-follower systems, multi-species grazing, pasture budgeting, and finishing cattle on pasture to assist livestock producers in progressing to grazing systems that begin to approach the best systems in the world.

Workshops on Land Use and Farmland Policy

New Project, Proposal

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Funding:

SARE: \$48,247

Match: \$46,019

Duration:

September 1998 - August 2000

With considerable stakeholder involvement, American Farmland Trust, Ohio State University and the Farm Foundation will design a one-day workshop and training materials to empower Extension and Natural Resources Conservation Service (NRCS) field staff on land use management issues and farmland protection. The two-year project will pilot test the workshop format at five locations in Ohio the first year and fine tune it at four sites in both Illinois and Iowa the second year. The quality of the materials, use of the Internet, involvement of farmers and broad spectrum of stakeholders involved in developing these workshops makes this project unique in its efforts to address the growing need in our region for information on land use at the local level.

Objectives of this project are to: 1) provide a training opportunity for Cooperative Extension and NRCS field staff in Ohio, Illinois and Iowa on the issues inherent in land use pressure at the rural-urban interface and policy options for guiding land use change in the interest of protecting farmland; 2) provide them with the following specific capabilities: a) How to determine land use, economic and demographic changes in their counties, b) How to determine citizen preferences and attitudes about land use patterns, c) Detailed understanding of existing or potential tools and techniques to guide development and protect farmland, and d) Understanding of comprehensive planning as a formal process and the plan as a strategic document; and 3) Establish the basis for continuing "informal" involvement in land use policy discussions and participant-offered training of others as future needs arise.

Outreach Education for Permaculture as Native Science

Annual Report

Project Coordinator:
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Funding:
SARE: \$47,960
Match: \$31,500

Duration:
September 1997 - August 1999

The Center for Permaculture as Native Science is an on-going program on the Rosebud Lakota Reservation in south central South Dakota. In this 1997-98 project SARE PDP supports the learning and implementing by Program Assistants. Most education is hands-on and on-site in the neighborhood of each Program Assistant. Topics/actions include food gardening, shelterbelt planting for protection and gathering, nutrition and health education for prevention of diabetes, family honeybees, renewable energy and Lakota Youth activities. Special advances were made this year in self-confidence and leadership skills of the Program Assistants, quantity and quality of food gardens, interest in and actual tree planting, renewed pride in gathering and drying, establishment of honeybee hives and renewable energy education. Youth involvement increased many fold and Elders became more willing to participate and share their knowledge. Our intended audience is Lakota people of all ages, especially those living in HUD housing clusters. The participation of Youth, Adults and Elders indicates everyone's pleasure in building self-confidence and re-acceptance of cultural traditions through food gardening, re-establishment of thickets, gathering, and re-connecting with Mother Earth and all our relatives.

The first objective of this project was to have participants putting workshop education into practice, i.e., more families begin/continue food gardening within a permaculture design. In the communities of the Program Assistants, food gardens more than doubled, kids planting trees as shelterbelts rose to the hundreds, Youth helped Elders in plots of potatoes as a new activity in five communities. Family honeybees are definitely established in two communities. Objective two was that program outreach personnel and others begin community projects of planting and care. Activities listed above included many new people in 1998. The third objective was that program outreach personnel gain self-confidence and develop relationships with similar personnel such as Extension, and (Natural Resources Conservation Service (NRCS). New confidence, which is overcoming the degradation of 150 years of church and government oppression, shows clearly in five of the Program Assistants and their neighbors who are no longer embarrassed to garden, gather, dry, etc. — in fact are doing so proudly and involving their kids and grandkids. The new self-confidence of the Program Assistants has drawn mixed results regarding relationship with the personnel of government programs, i.e. defensiveness and confrontation, beginning openness, hesitant but helpful responses. These are cultural difficulties; openings, long overdue, are being made. Objective four was that nearby Extensionists join the Outreach programs' efforts. Contact with nearby Extensionists has been made. To develop an active relationship in which the government Extensionists and the reservation Outreach people join and share will require continued effort.

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Outreach Education for Permaculture as Native Science

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The final objective of this project was that Permaculture as Native Science be brought to the school kids. Major results for this objective are principally second-hand, which may be the way it will happen — native science filtering in, being accepted and re-taught. The spring 1998 service learning projects in the Todd County and White River schools included the Lakota perspective, through the kids themselves bringing their burgeoning pride of community improvement into the classroom. This fall, one person to whom we have been giving encouragement and direction is finding opportunities as a “guest” in the Todd County school.

In terms of audiences affected by this grant, our activities are closely related to the 1994 land-grant university Sinte Gleska. That things are happening on the reservation is raising the awareness of the South Dakota 1862 land-grant to our cultural knowledge of the land, and that our knowledge is worthy of their respect. Our activities are serving as a step toward the State and the Reservation working together. Our searching for funding has brought the realities of the reservation into the awareness of many who serve on non-profit boards. Our reservation is “checkerboarded,” the outside boarder diminished to one county (Todd) and within that border are many operating ranches begun as homesteads. As we develop our own Outreach professionals and these ranchers see us begin practices of sustainable, environmentally-beneficial food production and self-sufficiency, improved relationships between Tribal members and white ranchers are being fostered.

Word comes back to us frequently, first hand and second hand. Enthusiasm is high that food gardening and gathering are being encouraged and respected, and that resources are being made available where needed. Informal reports come in from the communities about the positive effects that gardening together is having on the healing of the breakdown of community, the beginning feelings of solidarity; and that someone cares enough to provide information especially prepared for them, and to keep following up. Self-identified leaders are emerging from the participants, some are Adult children of knowledgeable Elders; some are sober adults responding to available guidance to initiate meaningful actions that will benefit community and Youth. All are themselves new at the “doing” (gardening, tree planting, etc), but now consider themselves as gardener-educators. They are greatly encouraged by the opportunity and implementation of these activities which are benefiting the community, resulting in improved health of body and spirit of the People and of Mother Earth.

The self-confidence of those emerging from participant into leadership roles is beautiful to see. Characteristics of taking responsibility, following through and confidently presenting or demonstrating relevant material are becoming evident. The neighbors of these leaders are coming along, with apparent appreciation for the needed nudge. An exhilarating example is that three of these new leaders attended the national conference of Community Gardeners and presented the Lakota Permaculture program, each describing her own Housing Cluster and the response of its Youth, the involvement of its Elders — this by participants who had never been off the Reservation before, to representatives of similar programs nation-wide. Everything we’re doing, slowly with respect, could be applied in other areas of similar socio-economic conditions, such as other reservations, poor rural areas or inner cities. The word of caution would be that our program began at the request of community members who were ready. Availability can come in from the top, but it may take several years of alertly waiting before the potential participants come forward to make an action (project) their own from its beginning.

Outreach Education for Permaculture as Native Science

New Project, Proposal

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Funding:
SARE: \$36,450
Match: \$68,400

Duration:
September 1998 - August 2000

The Sicangu Lakota People live on the Rosebud Sioux Reservation in south central South Dakota, on the border with Nebraska. New gardeners from a 1995 project for food gardening and prevention of diabetes are now the heart of an action for Permaculture design, centering around family allotment houses and Housing and Urban Development housing clusters. The Sicangu are preparing and delivering experiential educational events and implementing Permaculture practices in the communities. Involved are emerging new practitioners, community leaders, personnel of tribal offices of Natural Resources, Forestry and Housing, outreach personnel from the local 1994 land grant college (Sinte Gleska), and the professional personnel of nearby offices of the South Dakota and Nebraska Cooperative Extension and Natural Resources Conservation Service.

The objectives of this project are: 1) that this project's participants put workshop education into practice, in order that: a) more families from more reservation communities follow the example being set by their peers and begin food gardening and continue on with a permaculture design, b) community solidarity is strengthened, c) awareness is being raised and action being taken in order that food gardening play a role in the prevention of diabetes; 2) that the outreach personnel from Sinte Gleska and the personnel from Tribal offices such as of Natural Resources, Forestry and Housing become informed and enthusiastic about Permaculture and begin family and community projects of planting and care on reservation lands and housings; 3) that the outreach personnel from Sinte Gleska gain self-confidence and develop a working relationship with the nearby Extension and Natural Resources personnel from the state land-grants (South Dakota and Nebraska); 4) that the nearby Extension and Natural Resources personnel from the state land-grants acquaint themselves with the reservation, change their policy from acculturation to respect; learn, promote and teach Lakota Permaculture and assist new practitioners; and 5) that Permaculture as Native Science be brought to the school kids.

Educate the Agricultural Educators and Bankers on the Profitability, Lifestyle and Environmental Benefits of MIG for the Livestock Farmers of Central Wisconsin

Annual Report

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12 Grass-Based Farmers

Funding:

SARE: \$12,500
Match: \$25,000

Duration:

September 1997 - August 1999

The objectives of this project are to educate local agricultural educators and bankers about the benefits of Management-Intensive Grazing (MIG), and to develop grazing farm pasture walks and a curriculum for agricultural educators to follow so that MIG can be successfully taught to our future farmers. This project will be part of a comprehensive effort by the Central Wisconsin River Graziers Network, in cooperation with local agricultural related agencies to promote the environmental, lifestyle and profit advantages of adopting MIG. This phase of the project is focusing on educating the agricultural educators and bankers in Marathon County and Lincoln County. A local Conservation Specialist working in the Land Conservation Department is working with grass-based farmers in the Network.

This project began by initiating personal contacts with agricultural educators and bankers to explain the basics of grazing based farming. All educators and bankers in Marathon and Lincoln County were invited to all the pasture walks and other grazing-based farming field events that we held so far in 1998. We organized a training session specifically for the agricultural educators. The basics of grazing-based farming were explained to them as well as the economic, lifestyle and environmental benefits. An in-depth discussion was held with the educators to assess their current views of grazing-based farming and how to best implement grazing-based farming into their curriculum. All educators were provided with a University of Wisconsin *Grazing Reference Materials Manual*.

Phase I was to be evaluated by the number of participants who attend the training sessions. Our goal was to have 50 percent of the agricultural educators attend our training session. We had 35 percent of high school educators and 50 percent of the technical college instructors attend the first session, which was lower than we anticipated, but we felt we had an excellent meeting and have a sound foundation to start curriculum development. For Phase II, we will develop a curriculum for the agricultural educators to follow. A thorough investigation into the current curricula available from UW and other schools that have grazing courses will be conducted. Appropriate course material will be used from all existing sources to avoid duplicating usable materials already available. A general curriculum will then be developed for both the high school and technical college levels. The curriculum will be developed primarily by the Conservation Specialist but will be reviewed and approved by advisory members from the Grazing Network, UW-Extension, NRCS and key agricultural educators. The curriculum will consist of classroom instruction of basic grass management techniques, the tools needed to properly manage a grass based farm and instruction on the environmental and lifestyle benefits of MIG. The classroom curriculum will be tied to on-farm visits to expose students to active profitable grass-based livestock farms.



Educate the Agricultural Educators and Bankers on the Profitability, Lifestyle and Environmental Benefits of MIG for the Livestock Farmers of Central Wisconsin

New Project, Proposal

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Match: \$25,000

Duration:

September 1998 - August 2000

This project will be part of a comprehensive effort by the Central Wisconsin River Graziers Network, in cooperation with local agricultural related agencies, to promote the environmental, lifestyle and profit advantages of adopting Management-Intensive Grazing (MIG). This phase of the project will focus on educating the agricultural educators and bankers in Marathon County and Lincoln County. A local conservation specialist working in the Land Conservation Department will work with grass-based farmers in the Network to accomplish this mission. The project is one part of our Network's effort to promote the feasibility of grazing-based farming as a profitable way of farming that enhances lifestyles and protects and improves the environment.

Specific objectives of this specific project include: 1) Educate local agricultural educators and bankers about the benefits of MIG; and 2) Develop grazing farm pasture walks and a curriculum for agricultural educators to follow so that MIG can be successfully taught to our future farmers.

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State Sustainable Agriculture Reports

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Illinois

The Agro-Ecology/Sustainable Agriculture Program (ASAP) at the University of Illinois at Urbana-Champaign (UIUC) seeks to be an active presence on campus and across the state to "facilitate and promote research and education which protect Illinois' natural and human resources and sustain agricultural production forever." ASAP has developed a "three-tiered" approach to meeting the goals of the strategic plan. First, there is an internal component that refers to activities directly associated with the College. Second, there is an external component that refers to statewide activities not directly related to College units. Third, there is a national component that refers to involvement with regional or federal programs.

Internally, ASAP seeks to be an active presence on campus to facilitate and promote research and education which protects Illinois' natural and human resources and sustains agricultural production forever. We are currently working with several UIUC researchers locating farmer cooperators and facilitating outreach and education for specific projects within their research programs. ASAP team members serve on several committees and task forces including the University of Illinois Extension (UIE) Natural Resources Management Team, Environmental Education Issues Team, Sustainability and Efficiency of Agriculture in Central Illinois, and the Land Use Task Force. Besides serving on the various teams, committees and groups, ASAP will begin or continue several projects which interface directly with College units.

Much of the work ASAP engages in is outwardly focused. There are many groups in Illinois working on issues related to agroecology and sustainable agriculture. It is our goal to facilitate that work in as far as it is consistent with our mission. Externally, ASAP team members are active in the many organizations and programs around the state including the Association of Illinois Soil and Water Conservation Districts, USDA NRCS State Technical Committee, Illinois Sustainable Agriculture Committee, Illinois Grape Growers and Vintners Association, Central Illinois Irrigated Growers Association and the Lake Vermilion Water Quality Coalition. ASAP is also involved in several NCR SARE activities and programs. In addition to our involvement with the groups listed above, there are several program activities which originate in ASAP.

The following is a list of the activities and accomplishments for 1998.

Agro-Ecology News and Perspectives: A quarterly publication, that is designed to inform its readers about the well being of human and natural communities through the adoption of agricultural practices and farming systems that are economically viable, environmentally sound, and socially just.

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ASAP Homepage: The ASAP homepage (<http://www.aces.uiuc.edu/asap>) includes information about the sustainable agriculture program at the University of Illinois, training and education, regional study circles, Illinois Soil Quality Initiative, research activities, calendar of events, publications and other resources.

ASAP Update: The ASAP Update is an electronic newsletter that is sent to administrators and staff within the College and to other interested persons. The Update provides information regarding ASAP activities and programs and information about sustainable agriculture programs in the region and the nation.

Farming Profitably in A Changing Environment: A day-long conference to enable producers to meet rapid change in agriculture head-on was held in Urbana. Three keynote speakers and more than 30 presenters in break-out sessions addressed topics including environmental issues, soil health and soil quality, marketing, organic agriculture, resource protection and conservation, and livestock and crop enterprises. Some of the breakout session topics included a pilot watershed program, soil organic matter management, composting, cooperatives, marketing, organic grain and livestock production, conservation tillage, management-intensive grazing, and conversion from grains to vegetables. A reception, "Savory and Sweet Gifts from the Land", featuring foods grown in Illinois and Indiana brought the event to a close. ASAP was awarded a grant from the NCR SARE Speakers Bureau.

Illinois Participatory Research Program: This is a new means of generating, sharing and validating knowledge pertaining to the development and maintenance of ecological and agro-ecological systems that sustain ag production and conserve natural resources. It is a process by which farmer- and rural community-groups can have direct access to university expertise for solving real-life natural resource management problems. IPRP is designed to help groups identify their research needs and connect with appropriate expertise at the university level. Financial resources granted by the IDOA Sustainable Agriculture Grant Program provide funds to pay expenses associated with research. Five grass-roots-, farmer- or rural community-based groups have been chosen so far for participation in the program - the Highland Silver Lake Commission, Illinois Grape Growers and Vintners Association and Central Illinois Irrigated Growers Association, Lake Vermilion Water Quality Coalition and Pembroke Growers of Kankakee County. The objectives are: 1) To provide a vehicle for farmer and rural community participation in agriculture and natural resource research; 2) To reconnect researchers with the end users of research; and 3) To provide training and programming for CES and other agency educators in sustainable agriculture and participatory research.

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State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Illinois

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Illinois Soil Quality Initiative (ISQI): ISQI is a group of researchers, farmers and representatives from agricultural and environmental organizations working to identify soil-quality indexes that farmers can use to make decisions about their own stewardship goals. ASAP serves as the Outreach Coordinator for ISQI, contributing to the planning, design, implementation, and evaluation and supervising of the ISQI newsletter.

Integrating Sciences and Humanities for Sustainable Agriculture Seminar Series: ASAP will sponsor an occasional seminar series during 1998 and 1999. The first invited speaker was Paul Thompson, Joyce and Edward E. Brewer Distinguished Professor, Department of Philosophy, Purdue University, who presented a seminar entitled, Sustainability: What It Is and What It Is Not. The series is co-sponsored by the Agroecology/Sustainable Agriculture Program and the Ecosystem Based Management for Agricultural and Natural Lands Program (UIUC, Natural Resources and Environmental Sciences Department).

On-Farm Research: Sustainable agriculture farmer groups have maintained their interest in conducting on-farm research that was begun in 1988. Funding was received from a grant by the Illinois Department of Agriculture, Conservation 2000, Sustainable Agriculture Grant Program for 40-50 farmers to be involved in on-farm research projects.

Protecting Our Waterways: Riparian Buffer Zones Training Workshop was held on June 17-18, 1998. This professional development opportunity was offered in response to the need for Extension field staff and others to increase their awareness of the advantages that riparian buffer zones of the landowners. The workshop provided information in various buffer zone options, funding available and sources of technical information about the installation and maintenance of these practices. The workshop also included a farm tour.

Study Circles: Continued study circle efforts have included the publication of a study circle manual, *Advancing Sustainable Agriculture through Small Group Discussions: A Guide for Group Leaders and Members*. The handbook contains guidelines for setting up study circles, tips on forming productive questions, stories from existing study circles, and lists of reference materials that can be used to get discussions started. The materials walk group leaders through the basics of forming study circles, review discussions on the topic, offer tips on organizing groups, provide suggestions on questioning, offer help on adapting materials and provide worksheets, study reports and situations that have worked for others. The handbook also lists books, periodicals and learning materials from around the world that may prove useful to a discussion leader.

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Sustainability and Efficiency of Agriculture in Central Illinois (SEACIL): The emphasis of the project is the study of farming systems at the whole-farm scale (using nutrients, energy and dollar budgets). Farmers and researchers will work together to determine how collaborating farmers can manage their whole-farm operations more efficiently (economically and otherwise) given the limitations of energy resources. A study circle group of stakeholders and collaborators is meeting to discuss research ideas, results and plans.

SARE and Professional Development Program activities have included the following:

1998 PDP Workshops: Several individuals attended the 1998 Illinois, Michigan and Iowa PDP workshops, Facing a Watershed: Managing Profitable and Sustainable Landscapes in the 21st Century. ASAP provided leadership in the planning and the implementation of the Illinois workshop. ASAP will continue to work with the NCR SARE to develop programs and activities, include SARE information on our homepage, and provide resources about the SARE program to our partners in Illinois.

Field Day Grant Program: With funds from the NCR SARE, ASAP developed a Field Day Grant Program to provide local UIE, NRCS, SWCD, sustainable agriculture organizations and others with the opportunity to apply for financial support for local field day events in 1998. Grants awarded included funds for a windbreak workshop and field day; regional grazing workshops; riparian buffer zone workshop and a local SWCD workshop.

Four State SARE Conference: A four-state (Illinois, Indiana, Michigan and Ohio) SARE conference, Profitable Farming in a Changing Environment, was held on February 11-12 in Bryon, Ohio. ASAP served on the planning committee and coordinated efforts to bring research, education, and producer grant recipients and other interested persons to the meeting.

Producer Grant Workshops: To increase the number of NCR SARE Producer Grants in Illinois, ASAP organized a series of six regional workshops that provided farmers, UIE, NRCS and SWCD personnel with information about the SARE Producer Grant Program. The workshops were held in January throughout the state. Four Illinois producers were awarded Producer Grants this fall. These workshops were conducted again in February 1999.

NCR SARE Administrative Council (AC): Deborah Cavanaugh-Grant serves as the Extension representative to the AC.

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Illinois

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Train the Trainer Grazing Workshops: Three regional workshops on management-intensive grazing will be held with funds received from a grant from the NCR SARE PDP. The three workshops will provide personnel with an introduction to these systems through classroom instruction and field tours. Participants will gain a general understanding of management-intensive grazing systems and will have the necessary resources to refer the clientele to appropriate experts and other sources of information. The educators for the workshops include UIE, NRCS, UIUC researchers, grazing and forage specialists from other states and producers employing management-intensive grazing systems on their farms. The workshop schedule was: November 30 - December 2, 1998 at the Dixon Springs Agricultural Center (Simpson); March 15-17, 1999 at the Inn at Eagle Creek (Findlay); and April 12-14, 1999 at Highland Community College (Freeport).

In other activities, the 1999 World Food and Sustainable Agriculture Program: Agriculture's Changing Role in the Global Ecosystem is the title of the World Food and Sustainable Agriculture Program scheduled for the last week of January and the first two weeks in February 1999. Three speakers were brought in for the Wednesday and Thursday of each of the three weeks of the program. Each speaker gave a keynote address open to the public and will spend "day-2" with College of ACES faculty and students in a variety of settings. The schedule of the WFSAP was: January 27-28, Charles M. Benbrook, *Untapped Opportunities in the Pursuit of Intensification: Lessons from the Heartland Shaping American Agriculture's Place in the Global Food System*; February 3-4, Sandra Postel, *Global Water and World Food Security* and February 10-11, William Lockeretz, *Fostering Stewardship in Agriculture: Not Just How, But Who?*

ASAP also participated in the West North Central SWCS Manure Management Conference Planning Committee, *Managing in Harmony with the Environment and Society*, February 10-12, 1998, Ames, Iowa. Deborah Cavanaugh-Grant served as a member of the planning committee and coordinator of the concurrent sessions relating to societal concerns. Cavanaugh-Grant also participated in the Illinois Renewable Natural Resources Conference Planning Committee, March 4-6, 1998, Springfield, serving as a member of the planning committee and coordinator of the landscape theme sessions on agriculture.

Indiana

The Indiana Strategic Plan for Sustainable Agriculture is focused on advancing the understanding of sustainable agriculture in the state of Indiana and the Purdue Cooperative Extension Service.

In an effort to achieve this objective, the Purdue Cooperative Extension Service, in cooperation with other appropriate groups and individuals, has worked to: 1) create an awareness and understanding of the importance of sustainable agriculture throughout the state, 2) establish and nurture partnerships among state organizations, agribusinesses, and agencies within the state, 3) provide trainers (educators, NRCS staff, other partners and collaborators) with a foundation of sustainable agriculture knowledge, and 4) deliver educational programs that will encourage the use of more sustainable agricultural practices.

To achieve these goals, educational sessions for farmers, county extension educators, and state specialists were conducted during the year. To provide extension specialists an opportunity to learn more about holistic management and the role it can play in the management of production resources, Don Nelson from Washington State University was brought to Purdue. During this visit, Nelson met with several small discussion groups, with members of the Animal Sciences faculty, and members of the Sustainable Agriculture Team. He also prepared a videotape for use in an in-service training session on whole-farm planning.

On November 18-20, 1997, a workshop, entitled "Whole-Farm Planning," was conducted. A total of 12 county educators participated in the session lead by Purdue Extension Specialists, a sustainable agriculture not-for-profit organization, and a farmer. Objectives for this session included: 1) defining whole-farm planning, explaining its importance, and applying it to Indiana agriculture, and 2) illustrating through a case study the importance of fitting economic, ecological, and social systems together.

A key project for 1998 was "Ways to Grow." This project, funded by the Indiana Commissioner of Agriculture, is located in Southeast Indiana. The project provides detailed assistance to 26 families working to establish 51 new/alternative enterprises as a part of their farm operations. This project resulted in the creation of the Farm Based Enterprise Institute, an organization for providing training to farmers and county educators on the production, management, and marketing specialty crops. A total of three days of training was provided. This effort also helped farmers network with other farmers and buyers of specialty crops. The project has helped farmers identify information needs and useful information sources.

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Indiana

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During the year, efforts focused on: 1) greenhouse management, 2) aquaculture, 3) small fruits, and 4) woodland mushroom growing. The project has also supported study tours related to these topics. During the next year, the goal of the project is to provide assistance to 40 families working with about 80 enterprises. The project also planned a direct marketing conference on February 18 in Columbus, Indiana.

Collaboration with the Ball State faculty continues. Faculty from the Business School and the School of Landscape Architecture are working with "Ways to Grow" project members to complete market assessments, aid individual farmers in the development of a marketing plan, and assess the need for improved market infrastructure in Southeast Indiana.

A multi-state conference with Illinois, Indiana, Michigan, and Ohio, entitled "Profitable Farming in a Changing Environment," was held February 11-12 in Bryan, Ohio. This conference allowed people from the four states to meet and discuss their similar interests. It also provided a vehicle for learning more about the SARE-funded producer projects in each state. An important part of the conference was the small group discussions on the topics of research, development, and education; agricultural profitability; diversification; and marketing. These discussions resulted in several ideas for multi-state projects. For each topic, a lead individual was identified.

Iowa State University Extension's strategic plan for sustainable agriculture identifies three levels of audiences to be reached by sustainable agriculture training programs. Level I includes Iowa State University Extension faculty and staff and Natural Resource Conservation Service (NRCS) staff. Level II includes other state and federal partners, such as Iowa's Department of Agriculture and Land Stewardship, and Level III includes a wide range of other potential partners, such as farmer organizations, lenders, and crop consultants.

Since 1996, introductory classroom sustainable agriculture training has been provided to more than 160 Extension employees and about 40 NRCS staff. Introductory training has also been provided to 150 USDA Farm Service Agency staff and about 10 people from other partner organizations, including the Iowa Department of Agriculture and Land Stewardship, Soil and Water Conservation Districts, and Resource Conservation and Development offices.

The next step identified in the strategic plan is to build on the general awareness and understanding created by the introductory training to achieve comprehension and competency on the part of Extension and NRCS employees, so they can provide technical assistance in sustainable agriculture to clients. In addition, educational efforts should be extended to introduce ideas of sustainable agriculture to Level III audiences. At the same time, an ongoing effort is needed to provide introductory training on sustainable agriculture to new Extension employees.

During 1998, ISU Extension conducted several successful sustainable agriculture programs. In January, one day of classroom training on sustainable agriculture topics was provided to 10 Extension faculty and staff in the Horticulture Department. Topics covered included an introduction to sustainable agriculture, organic production, community supported agriculture, pest management, use of native plants for landscaping and prairie restoration, and composting.

In February, two days of classroom training were provided for 150 Farm Service Agency county and state staff and a handful of new Extension county directors and field specialists. Topics covered included an introduction to sustainable agriculture, economic issues, alternative swine production facilities, organic production and marketing, innovative marketing strategies, tillage and cultivation, and management-intensive grazing.

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Iowa

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Iowa

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In partnership with Practical Farmers of Iowa, ISU Extension sponsored three on-farm workshops in July for agency staff and farmers. These workshops attracted 84 participants, including seven ISU Extension staff, 17 NRCS staff, 20 FSA staff, and one employee of the Iowa Department of Agriculture and Land Stewardship. The workshops were funded by a PDP grant from the North Central SARE program.

In September, ISU Extension organized two workshops on organic agriculture to test an organic curriculum developed with a North Central SARE PDP grant by Cooperative Development Services. Forty-one people attended the workshops, including three Extension staff and one NRCS employee. In addition, more than 30 people who could not attend the workshops asked to have the written materials sent to them.

All these events relied on a combination of farmers and university and agency staff, as well as other appropriate individuals, to provide the training. Evaluations of these events consistently emphasize the benefits of having views of both farmers and other agricultural professionals presented.

At this stage the Extension PDP program is in transition from providing introductory classroom training on sustainable agriculture to providing more in-depth follow up on specific topics related to sustainable agriculture. Extension will continue working with other organizations supportive of sustainable agriculture to reach audiences beyond Extension employees. Key partners are the Practical Farmers of Iowa, the Leopold Center for Sustainable Agriculture, and federal and state agencies. Over the next two years the PDP program will focus on providing information on sustainable nutrient and pest management to agricultural professionals around the state through workshops and written materials. This effort is funded in part by a Section 319 implementation grant provided by the Iowa Department of Natural Resources.

Another challenge is to assess the impact of the introductory training provided to date. In June, a survey was mailed to all county extension education directors and field specialists in areas related to agriculture concerning their use of the Sustainable Agriculture notebook provided at the introductory classroom training. Of 36 people who responded, 24 reported having received the notebook, and 17 reported having used the notebook at least once after training was over. Several of those who reported not having received the notebook commented that they had been hired recently. The response rate was low, but it seems that more than half the Extension staff who attended the introductory training have used the materials they received at least once.

Kansas

Objectives of the Kansas state sustainable ag program include: 1) to follow-up on the initial orientation workshops with "Advanced Topics" training sessions; 2) to continue to assemble farm profiles, and assemble into a directory of potential farm visits and panel presenters for Agents and others to involve in meetings. The directory of farm profiles is intended to provide visibility to alternative resources in Kansas; and 3) to develop and write up decision cases to be used as teaching materials during farm visits, for classroom use at K-State and for various extension presentations.

The first of the Phase III sessions was designed as a one day tour to look at crop rotations and alternative weed management, the two areas that the northeast area had ranked highest during the evaluation. In October 1998 vans were used to visit two farms, then, after lunch a decision case was presented to experience choices that could be made in determining crop rotations. The Northeast Area Agronomy Specialist and State Weeds Specialist, along with Kansas Organic Crop Improvement Association and three producers provided leadership. Seventeen people participated — seven extension agents, three USDA Federal Crop Insurance personnel, three state extension specialists, and one from the Kansas Department of Health and Environment, one from Kansas Rural Center, a producer, and the Coordinators. Three more regional training sessions are planned later this year; they will focus on the areas of cover crops, crop rotations, alternative weed management, economics of sustainable agriculture, and whole-farm planning.

The list of farm profiles based on PDP farm visits continues to grow, there are now more than 20 collected. To orient training participants to a site we are about to visit, we pass out a (usually) two-page profile of the operation with a map for orientation. Though we often focus on one aspect of an operation, we want to be sure that it is framed within the context of the whole farm. Our next goal is to put them in a common format and publish as a directory.

The decision cases that have been developed are oriented similarly to the farm profiles, being sure to portray the entire farm for a view of all resources available. Decision cases are decided upon as unique situations are encountered on specific farms that can contribute to the common knowledge. Through the Kansas Rural Center several cases are developed around pasture feeding of hogs, rotational grazing, and crop rotations. We continue to work on two cases, one looking at the urban/rural education interface (edge of Kansas City), and the other focusing on stream erosion that is threatening a farmstead with a municipality on the other side of the stream.

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Kansas

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During the day-long focus on crop rotations and alternative weed management that included visits to two field sites and the working through a decision case, participants saw, dialogue about, and worked through aspects of these subject areas, along with receiving numerous handouts.

Decision cases have been used by the Kansas Rural Center in on-farm training sessions for college classes from Mid-America Nazarine University and in NRCS training sessions. More county agents are including sustainable agriculture (cover crops, alternative enterprises, soil quality, whole-farm planning) in their regular programming, possibly as a result of these PDP trainings. Publications include decision case studies (drafts in prep), a sustainable ag web page, and handouts from the advanced training meeting.

We are collaborating with the non-profit sustainable ag organizations in Kansas on the Farm Profile Directory, the on-going annual "Heartland Roundup" meeting, and future grant-writing for PDP, Research, Demonstration, and Farmer projects.

Nationally, it seems like sustainable ag educational programs need to respond to the recent shift in ag profitability (or lack thereof), possible policy options, and survival strategies for farmers. Programs also need to address the reality that many farmers now have off-farm jobs to support their families, their time and financial resources are even more limited than before, and there is a growing sector of semi-suburban "weekend farmers" that also want information on sustainable agriculture.

Mini-grants received from the NCR SARE regional training program included: 1) Darrel Parks and Todd Delac were able to attend the alternative hog production seminar that was held in West Lafayette, Ind., in December 1997. Darrel later held his own field day to demonstrate his activity that is focused on improving water quality; and 2) Stan Freyenberger attended the IFFS and Holistic Management Educators meetings in Pasco, Wash., in January 1998. He is presently in a mentor program to become a certified educator of Holistic Management.

Michigan

Michigan State University Extension continued its work during FY 1998 to support and encourage sustainable agriculture educational programs in a wide range of settings across the state. The diversity of the state's agriculture and its people has resulted in a very broad-based approach. Rather than promoting a specific sustainable agriculture program, Michigan researchers and extensionists are working to add concepts and information to food and agriculture programs across the board which will help move those programs in the direction of greater sustainability.

Some highlights of Michigan's Extension sustainable agriculture work during 1998 included:

- 1) Promotion of many sustainable agriculture learning opportunities to Michigan Extension staff members and provision of financial support to participate in some of them.
- 2) Several area of expertise team in-service education programs included portions supporting more sustainable approaches. For example, a vegetable program included portions on nitrogen monitoring, pest management updates, vegetable IPM, and pesticides at risk. A field crop session included agent reports on local sustainable agriculture projects.
- 3) MSU Extension worked with Michigan Integrated Food and Farming Systems to plan and carry out a workshop on "Facilitation and Leadership Skills — Resources for Organic & Sustainable Food & Farming Leaders."
- 4) MSU Extension worked closely with several other organizations to move toward a vote on establishing a wheat check-off program in Michigan. Adding wheat could enhance crop rotations in large areas of the state and will be critical in maintaining the current milling industry.
- 5) Three days of "Sustainable & Organic Food & Farming Connections" educational programs for the public at MSU. Topics included Michigan's response to national organic standards, organic and local entrepreneurs adding value, and agroecology — the science of sustainability. The programs were planned with input from farmer and consumer groups and the state department of agriculture.
- 6) Publishing *Michigan Field Crop Ecology: Managing biological processes for productivity and environmental quality*. This 92-page Extension bulletin was designed to help leading farmers and extension agents understand and use a biological systems approach to agriculture. Several educational programs for

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Michigan

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both agents and farmers were held during FY 1998, with more planned for the future.

7) Extension agents planned and conducted an organic production and marketing tour that helped both agents and farmers learn more about the potential for certified organic products.

8) Michigan's Thumb Oilseed Producers Cooperative, a local farmer cooperative formed with strong leadership and support of the local Extension agricultural agent, signed an agreement with Agro Management Group and USDA Alternative Agricultural and Commercialization Corporation to build a local facility that will process engine oil from soybeans and canola grown by the co-op's members.

9) MSU secured funding to help support organic on-farm research and demonstrations in addition to continuing its support for sustainable on-farm research and demonstrations. This work is done in close cooperation with the Michigan Organic Food and Farm Alliance (MOFFA) and Michigan Agricultural Stewardship Association (MASA).

10) MSU Extension and other organizations sponsored a value-added conference focusing on agriculture.

11) More than a dozen people from Michigan participated in a Four-State SARE conference that highlighted sustainable agriculture accomplishments.

12) Michigan hosted one of the North Central Region SARE Train-the-Trainer workshops and a NCR SARE Administrative Council meeting.

13) MSU agreed to work closely with a new nonprofit organization, Michigan Integrated Food and Farming Systems (MIFFS), that grew from a foundation-funded project.

Based on questionnaire responses from 42 of Michigan's 82 counties plus four district agents, during 1998: 131 farmers were involved as trainers for Extension sustainable agriculture programs; 37 extensionists completed in-service education programs on sustainable agriculture; 33 extensionists planned to recommend one or more sustainable ag practice; 29 extensionists did recommend one or more sustainable ag practice; 3,290 people completed Extension programs on sustainable agriculture; 1,685 people planned to adopt one or more sustainable ag practices; and 1,066 people did adopt one or more sustainable ag practices.

Minnesota

Strategies for carrying out the Minnesota sustainable agriculture professional development program (PDP) plan include: 1) Publishing a monthly sustainable agriculture newsletter; 2) Publicizing and providing funds for speakers for sustainable agriculture educational events, and providing scholarships for extension faculty to attend sustainable agriculture events; 3) Assisting extension faculty and other educators in planning sustainable agriculture educational events for farmers; 4) Taking teams that include extension faculty to SARE-funded educational events; 5) Working with other organizations to develop, promote, and distribute sustainable agriculture educational materials; and 6) Making extension faculty and others involved in sustainable agriculture research and education aware of funding opportunities and helping them think through proposal ideas.

Significant accomplishments and training events in 1998 include:

- 1) Our monthly newsletter, *Sustainable Agriculture*, continues to be well-received and we now distribute more than 2,800 copies each month. The audience includes extension, research, and teaching faculty, partner organizations, and private citizens.
- 2) Extension faculty in northwest Minnesota were involved in planning and conducting two workshops and two field days on organic crop production. They are currently planning two more workshops to be held late in 1998. Extension educators in central Minnesota organized farm tours on organic crop production and on grazing.
- 3) About 15 University of Minnesota extension and research faculty, representatives of non-profit organizations, state agency officials, and farmers attended the national SARE conference in Austin, Texas, in March.
- 4) One Minnesota extension faculty member attended and led a decision-case discussion at the SARE regional training workshop, "Facing a Watershed: Managing Profitable and Sustainable Landscapes in the 21st Century," held in Michigan. Three Minnesota extension faculty members attended and were involved in teaching workshops at the regional training session in Iowa.
- 5) Four extension faculty requested scholarships to attend two-day training sessions on grazing management that were held at Morris and Preston, Minn.
- 6) Several extension faculty attended sustainable agriculture field days sponsored by the Minnesota Department of Agriculture and the Sustainable Farming Association of Minnesota.

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Minnesota

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7) Several extension faculty worked with the Minnesota Institute for Sustainable Agriculture to develop and review two new extension bulletins, "Organic Certification of Crop Production in Minnesota" and "Whole-Farm Planning: Combining Family, Profit, and Environment," that are now available from the University of Minnesota Distribution Center.

8) The extension Crop Systems specialization (about 60 extension faculty) listened to a presentation on organic crop production at the annual extension conference, and the specialization has invited two organic farmers and an organic extension specialist from Iowa to an in-service training session that will be held later this fall.

9) Three extension faculty and a Hmong vegetable farmer attended a small farm conference and trade show in Columbia, Mo., this fall. At the conference, the Minnesota group participated in a SARE-funded PDP project.

10) Extension faculty were listed as cooperators on three of the four Minnesota producer grant projects that were selected for SARE funding this year.

Minnesota extension faculty are becoming more familiar with sustainable agriculture concepts and more responsive to farmers who are interested in sustainable agriculture. Some extension faculty are currently involved in on-farm tests of sustainable practices and other faculty are working with farmers to plan additional projects. Extension faculty are also distributing sustainable agriculture educational materials and planning future sustainable agriculture workshops.

Missouri

The Missouri statewide strategic plan for extension programs in sustainable agriculture, "Sustaining People through Agriculture," developed in 1995, continues to provide a blueprint for professional development programs in Missouri. The program goal is to sustain a desirable quality of life for people through agricultural systems that are ecologically sound, economically viable, and socially responsible. The overall objective of the project is to help Missouri's farm families and rural residents sustain successful farms and rural communities through use of information and knowledge.

Objectives include: 1) To sustain profitable farming operations by relying more on the productivity of the people who farm and less on purchased inputs and industrial farming methods; 2) To sustain family farms, independent food producers, and viable rural communities as essential elements of a socially responsible agriculture; 3) To sustain, conserve, and protect the productivity and quality of soil, water, and other natural resources upon which agricultural productivity depends; and 4) To sustain local and regional food systems that are ecologically sound, economically viable, and socially responsible.

The overall strategy for Sustainable Agriculture PDP work in Missouri shifted from orientating extension workers to sustainable agricultural concepts to creating co-learning opportunities for extension and farmers to develop and implement educational programs. A greater emphasis has also been placed on building collaborative relationships with other program areas within the University, with other agencies and organizations, and with farmers in developing and carrying out sustainable agriculture professional development. State SARE PDP funds were allocated to fund a half-time sustainable agriculture program manager position, filled by Joan Benjamin, to facilitate the new direction in PDP strategy. Joan has also developed a highly effective working partnership with Debi Kelly of the Missouri Alternatives Center.

The most significant Missouri Sustainable Agriculture program during 1998 was a statewide conference, "Sustaining People through Agriculture." The conference addressed all four objectives of the strategic plan through half-day sessions devoted to Sustaining Families on Small Farms, Sustainable Grassland Farming, Farmer-to-Farmer Information Networking, and Local Community Food Systems. More than 140 people attended at least one day of the three-day program. The conference provided a co-learning opportunity for extension workers and farmers. Approximately one-third of those attending were extension workers or other information providers and the rest were farmers. As a consequence of this conference a new farmer network has been formed and has chosen the name, Sustaining People through Agriculture Network (SPAN). SPAN planned another conference for early 1999

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Missouri

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In June and July of 1998 Extension workers, farmers and other information providers from Missouri attended the NC regional PDP workshops in Illinois and Iowa which dealt with "Facing a Watershed: Managing Profitable and Sustainable Landscapes in the 21st Century." Four people attended the Illinois workshop, representing the University of Missouri, Lincoln University, Missouri Department of Agriculture (MDA) and the Natural Resources Conservation Service (NRCS). A total of 15 people attended the Iowa workshop, including seven farmers. Again the emphasis was on co-learning between farmers and information providers.

A NC regional SARE grant helped support a three-day PDP to be held in conjunction with the November 1998 "Small Farms Conference and Trade Show" in Columbia, Mo. Extension workers, farmers and representatives of non-profits, MDNR, NRCS, and other information providers from throughout the NC region have been involved in the planning and have been invited to attend this program. A larger than proportionate share of those attending will be extension workers from Missouri. This PDP will focus on development of a Sustainable Small Farm Information Network (SSFIN) to support sustainable agriculture information providers in Missouri and throughout the region.

The final organized PDP of the year was a series of four regional "Organic Farming" workshops scheduled for different areas of the state during December 1998. Planning for these workshops has been carried out by a diverse committee that included farmers, representatives from MDA and NRCS, and representatives from several different academic departments on the University of Missouri campus. The regional programs was followed by a statewide PDP in organic farming to be held in central Missouri in early 1999. This program is being jointly sponsored by the Sustainable Agriculture and Water Quality initiatives of University Outreach and Extension. Expenses for the statewide conference will be paid from University of Missouri Program Implementation Experience (PIE) funds

Overall, 1998 has been a highly successful year in strengthening collaborative relationships among the various organizations and agencies with responsibilities for providing sustainable agriculture information to farmers and between these information providers and the farmers they are charged to serve.

Nebraska

The plan of work for 1997-98 called for developing case study approaches for sustainable options to whole-farm planning. It also renewed the effort to include more staff in state and regional training opportunities. Much of the in-service needs were to be identified by action teams working on the Integrated Crop Management and Natural Resources and Environmental Management curriculum.

A case study farm was selected and faculty were encouraged to attend case farm study and Holistic Management (HM) workshops. Tom Larson, a Nebraska farmer, offered his operation to serve as a case study farm. A day was spent looking at Larson's operation and plans were made to convert his poster, depicting the seasonal flow through his farm, into a publication. Seven faculty members participated in two programs sponsored by the Nebraska Sustainable Agriculture Society (NSAS). The first was workshop on techniques for developing case studies, presented by University of Minnesota educators. The second was a HM course open to the public, which mixed agency, University and farmers on teams that studied and interacted with two host farmers using HM techniques.

Three programs were targeted to increase faculty exposure to sustainable agriculture issues: the NSAS annual meeting, the 10th anniversary SARE conference, and the regional NCR SARE PDP training. Eight faculty members attended the annual meeting of NSAS, including one who presented a workshop on evaluating new technology. There were 12 faculty and staff members who attended the 10th anniversary meeting in Austin, Texas, plus several Nebraska farmers and agency people. Presentations were made on cattle production systems and soil conservation. We promoted the regional PDP to new faculty members and had two Extension educators attend.

There were other opportunities for staff development that were supported by PDP funds. Registration fees were covered for faculty who attended the winter curriculum with programs such as weed ecology, and for the "Crop Diagnostic Clinic," where faculty learned about Integrated Pest Management, soil erosion and crop rotation. An in-depth cropping systems workshop was held for faculty, late in the summer, at the Ag Research and Development Center. There were two publications distributed to faculty, the Sustainable Agriculture Network's *Managing Cover Crops Profitably* and *Steel in the Field*.

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Nebraska

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PDP funds supported the development of an Integrated Crop Management and Natural Resources and Environmental Management Curriculum. The curriculum outlines five areas of competency, each with specific objectives and learner levels described. It provides faculty with an overview of the educational program offered by the University. Action teams will be able to use the curriculum to identify areas that are not currently addressed and faculty now have a document that can be used to design their personal training program.

The past year saw gains in exposure of faculty to sustainable ag concepts. There were many new faces attending the various training sessions. There is more main-streaming of sustainable agriculture through the action teams and programming reflects this change. "Opportunities in Organic Grain Farming," "Corn and Soybean Rotation Expo," "Environmental Assurance Program," "Using Organic and Inorganic Fertilizers for Nebraska Crops," and "Biological Control of Insect Pests" are examples of public programs offered by the University of Nebraska during the first three months of 1999. A new committee has been formed to identify training needs of faculty and NRCS, building on the case study and HM approaches which began in 1998.

North Dakota

The North Dakota State University (NDSU) Extension Service's sustainable agriculture strategic plan has focused on increasing the knowledge and understanding of sustainable agriculture by extension staff and other state and federal agencies. The application of this knowledge has also been focused through on-farm training and tours. Both general and specific training opportunities have been provided. Extension agents and specialists have been encouraged to include this information in their educational programming efforts.

In 1998, training was conducted via the interactive two-way video system to multiple sites throughout the state. This allowed agents and agency staff to participate without having to travel long distances, which requires more time away from the job and more expense. It also allows instructors (including extension, research, and farmer) to participate without requiring extensive travel and expense. This was much appreciated by both instructors and recipients of the training.

Two training sessions were completed in 1998. The first gave a five hour overview on the Holistic Management model by Wayne Berry, certified Holistic Management instructor. The second session dealt with alternative marketing methods and discussed Community Supported Agriculture (CSA), direct marketing, and entrepreneurial advice in developing a product and establishing a wholesale or retail market. Instructors included Dave Kraenzel, NDSU agribusiness development specialist; John Ikerd, University of Missouri-Columbia Extension economist, and two panels of producers involved in CSAs and direct marketing. The panels participated from multiple sites, which allowed their involvement since they could reach a site close to their residence.

This method of training will continue in 1999 with one more session on intensive rotational grazing scheduled. To date, this system of communication has been well received because of its convenience to participants, including farmers, other instructors, and those receiving the training. It has allowed the use of highly recognized out-of-state speakers by connecting with their states interactive video network. Since this training is conducted jointly with South Dakota, the ability to interact with peers in a neighboring state is enhanced.

Sustainable agriculture implementation funds have been utilized again in 1998 for mini-grants to encourage extension staff to highlight sustainable agriculture related to programming. These opportunities have created high response so that the grant applications submitted have been well beyond the funds available. Extension funds have been used to meet the shortfalls in most cases so that these worthwhile projects can proceed.

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State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

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Approximately 30 Extension Agents and Specialists, Natural Resources Conservation Service (NRCS) personnel, university researchers and representatives of sustainable agriculture non-profit organizations continue to form the core group of OSU Extension's Sustainable Agriculture Team. The team is actively networking with various faculty members, departments, commodity groups, and non-profit groups throughout the state to help farm families identify opportunities for increasing the economic, social, and environmental sustainability of their farm businesses. This report highlights some of the activities of the team during the past year.

Training programs conducted during the past year include the following:

The Sustainable Agriculture Team partnered with Innovative Farmers of Ohio and Ohio Ecological Food and Farm Association to conduct a series of 11 sustainable agriculture farm tours during the summer of 1998. This series of tours was titled the "Farm Ecology Tour Series," and attracted nearly 4,000 farmers, Extension agents, NRCS and Soil and Water Conservation District (SWCD) personnel, and others. This tour series was patterned after the 1997 SARE tour series conducted in Ohio. A SARE speakers bureau grant allowed Joel Salatin to speak at the "Country Living Field Day," which closed out this year's "Farm Ecology Tour Series."

Innovative Farmers of Ohio and the Sustainable Agriculture Team co-sponsored a day-long conference on alternative hog production strategies. More than 40 farmers, Extension Agents, and others participated in the conference.

Two day-long introductory soil health workshops were taught for more than 200 Extension Agents, NRCS and SWCD personnel, farmers and others. Fred Magdoff, of the University of Vermont, was the featured speaker at the workshops, which were funded with a SARE PDP grant.

More than 130 Extension Agents, NRCS personnel, farmers and others participated in a series of four workshops on the topic of "Putting Soil Health into Practice." The workshops demonstrated various soil health monitoring and assessment tools. As part of the training activity, four different teaching modules were developed on soil health topics and are available for use by Extension Agents, NRCS personnel, and other trainers. Soil health test kits were also developed and placed throughout the state for use by trainers. An Ohio Soil Health Scorecard has also been developed.

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The Sustainable Agriculture Team partnered with Innovative Farmers of Ohio and Ohio Ecological Food and Farm Association to conduct a four-state SARE Conference in Bryan, Ohio. More than 80 farmers, Extension Agents, non-profit organization representatives, NRCS personnel, university faculty members, and others from Ohio, Michigan, Indiana, and Illinois participated in the conference.

In November 1998, four one-day introductory whole-farm planning workshops were held in four locations throughout the state of Ohio for Extension Agents, NRCS personnel, farmers and others. The workshop introduced participants to the concept of whole-farm planning, and demonstrated several whole-farm planning and assessment tools. In 1999, more in-depth follow-up workshops will be offered to help trainers become more proficient with the use of various whole-farm planning tools such as Holistic Management, Planetor, Farm-A-Syst, Finpak, etc.

A quarterly newsletter continues to be published for all Extension Agents, Sustainable Agriculture Team members, and other agricultural professionals who express an interest in sustainable agriculture (NRCS, SWCD, vo-ag teachers, etc.). A quarterly electronic listing of sustainable agriculture related events is made available to all Extension Agents and Sustainable Agriculture Team members. A listserve for sustainable agriculture in Ohio has been developed. The listserve provides Extension, NRCS, non-profit organizations, farmers, and others a forum in which to share information about sustainable agriculture topics. The Sustainable Agriculture Team is in the process of developing a web page which will contain information about sustainable agriculture in Ohio and be linked with other sustainable agriculture sites.

Ohio

South Dakota

South Dakota's sustainable agriculture program includes a joint Professional Development Program with North Dakota and additional activities conducted exclusively within South Dakota. During the past year, SARE PDP funds have been used to continue a program of training Extension agents and Natural Resources Conservation Service (NRCS) staff. Other entities have also been invited and have participated, primarily independent bankers and lenders.

The joint PDP training in 1998 utilized the Rural Development Telecommunications Network (RDTN) which is an interactive video/audio system. Agents, producers, and NRCS staff participated from multiple sites, thus efficiently utilizing time and travel resources. The two sessions conducted in 1998 were "Holistic Management" and "Alternative Marketing Methods." Both training sessions were five hours and utilized university and college instructors, out-of-state university instructors, and producers involved in the systems described. Participant feedback from evaluations indicated general favor with the RDTN method of training primarily because of convenience and cost savings. Evaluations also indicated the desire for more and continued sustainable agriculture programming.

Separate tours have been conducted by university extension specialists and also by county extension agents to out-of-state locations. Mini-grants were offered to Extension staff with sustainable agriculture implementation funds. This has been well received, and a number of demonstration projects and tours have been conducted. Agents are also becoming more involved in the NCR SARE producer grant program by encouraging producers to apply and also by being an active part of the projects.

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Wisconsin agriculture is a dynamic, changing industry of 70,000 farms covering 17,500,000 acres producing over \$5 billion of food and fiber products. These numbers may impress some people, but those who make a living from agriculture, consumers concerned about their food supply, and Wisconsin citizens concerned about the environment have a stake in this dynamic industry. Sustainable agriculture is described as a farming unit maximizing on-farm resources, renewable energy, and skillful management. It is diversified, flexible, cost-effective, and environmentally sound family farming.

Wisconsin sustainable agriculture program conducted a strategic planning effort in the early part of 1998. This planning effort attempted to appraise the internal as well as the external components of sustainable agriculture in Wisconsin. This effort will lead to implementation strategies for existing and future educational thrusts directed at: 1) optimizing farm profits while protecting the quality of the environment, 2) improving the quality of life for farm families, and 3) assuring consumers of a safe, wholesome food supply.

This planning effort has led to a reorganization of Sustainable Agriculture Task Force. There are two components of the reorganization. First will be the formation of an executive committee and second the formation of a larger task force. The Task Force will identify needs and delivery of educational efforts. The executive committee will be responsible for the development, implementation and evaluation of programs. These efforts will be the following four areas: 1) Sustainable Agriculture Systems (Organic, CSA's, grazing, diversified agriculture, value-added production, alternative crops); 2) Nutrient/Environmental Education Training; 3) Family Scale Farming Operations; and 4) Small and Part Time Farming. The reorganization of the executive committee and task force has been completed, and both bodies have had several meetings

Training Sessions included the following:

Whole-Farm Planning: Four whole-farm planning presentations were in May and June as part of on-going training for NRCS employees on natural resource planning. Three of the presentations were for experienced NRCS field staff. One was for recent NRCS hires. Quality of Life modules were used that included role-playing and active group process. Farmers learned about a number of programs they could use to improve their planning. NRCS employees were connected to the people who offer the programs. Also, information on whole-farm planning was presented to the Great Lakes United annual meeting in Milwaukee. Michelle Miller was the trainer. A six-page handout on whole-farm planning, copies of the NRCS/NASDA report on whole-farm planning, and a website were developed.

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Wisconsin

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Commercial Organic Vegetable Production: Two two-and-a-half-day workshops were conducted. The first was intended for inexperienced farmers and the second intended for advanced vegetable growers. Participants learned about organic industry, raising vegetables on a large scale (from 25 to 600 acres) including equipment selection, crop selection, and harvest and storage tips, planning and farm management. Other topics included labor management, market development, processing, and community kitchens. A mailing of materials was sent to those expressing an interest and educators in the targeted Rock River Watershed. Trainers include: Deborah Beebe, Goodness Greeness; Walter Goldstein, MFAI; Jean Paul Courtens, NY farmer; Richard DeWilde, WI farmer; Ann Sinclair, Shari's Organics; Ralph Moore, Market Farm Implementation; Steve Pincus, WI farmer; Leslie Schaller, ACEnet; Paul Whitaker, UWEX; Jim Riddle, IOIA; Dan Egel, SWPAC; John Hirzel, OH farmer; and Anthony Cinzoni, MI farmer. A notebook and website were developed.

General information on sustainable agriculture: Southeast Wisconsin horticulture agents learned about sustainable agriculture and organic farming as a result of a two-hour presentation. Michelle Miller and Dave Engle, WI Chapter OCIA, were the trainers. A "Midwest Organic Guide" and a display of materials were developed and placed on a website.

Ethics and Agriculture: Sixty farm youth learned about ethics and agriculture as part of their week-long summer camp for senior youth in the Wisconsin Farmers Union. The workshop included a short introduction, and an exercise for small groups to discuss ethical issues facing agriculture today. The workshop was based on materials generated in the "Soul of Agriculture" project. Trainers included: Michelle Miller, Farmers Union Education Director Cathy Statz, and six young adult camp counselors. Part of this group wrote a piece on agricultural ethics and teaching materials were developed for use at the farm youth camp.

Other Events included: 1) The conference: "Sustainable Wisconsin: How We Can Make It Happen" in October; 2) Two events this past year resulted when three Extension Agriculture Agents and an executive director for Resource and Conservation Development District attended the Regional Professional Development Program on small farms. "Economic Options for Small Farms" attracted more than 150 people and "Diversified Agriculture" at Farm Progress Days, drawing more than 10,000 people, resulted; and 3) Progress is being made in developing a Management-Intensive Rotational Grazing Research and Education Center at Lancaster Agriculture Research Station. This center will have both a research and education agenda for the entire state in the manage-

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ment of intensive rotational grazing. The center will be located in the southwestern part of the state. This driftless area has seen a great deal of interest by farmers in the sustainability of agriculture.

Other linkages promoted by the Wisconsin state sustainable agriculture plan include the following:

Nutrient and Pest Management and Integrated Pest Management programs will conduct on-farm demonstrations. Field days and tours will be held.

The Center for Integrated Agriculture Systems will continue to be involved in promoting and implementing active ongoing research projects covering production technologies using recommended, limited and no chemicals as well as crop rotations, and various management techniques and skills.

Wisconsin Integrated Crop Systems trails will continue to provide evidence of sustainable practices and opportunities for continued research.

Grazing Networks will continue to be active and expand across the state providing needed farmer-to-farmer experience, demonstrations and training.

State and county Extension faculty and staff have continued to be an important aspect of the sustainable agriculture effort in Wisconsin. They cooperate in the development of educational materials and implementation of educational efforts. County faculty and staff continue to need current information to respond to questions and be Proposals-active in their efforts.

The Wisconsin Department of Agriculture, Trade and Consumer Protection will continue to be a strong partner in educational efforts related to developing regulatory policy and enforcement, as well as providing development grants, direction and assistance.

The Michael Fields Agricultural Institute has a long history of being involved in research and dissemination of information and as an advocate for sustainable agriculture.

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Pamela Bosserd in Marshall, Mich., uses various direct marketing strategies on her farm to sell horticultural products. Her goal is to transition from a conventional corn/soybean operation to marketing produce directly to consumers. Bosserd's SARE project also involves connecting school children to their food source.
FNC 97-183



A beautiful organic farm in Viroqua, Wisc., provides many marketing opportunities for grower Richard DeWilde. His SARE project included studying disease suppression potential of his on-farm compost.
FNC 97-163



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